No. XXI.

Aſtronomical, and Thermometrical Obſervations, made on the Boundary between the United States and His Catholic Majeſty. By ANDREW ELLICOTT.

Philadelphia, Sept. 23d, 1800.

DEAR SIR,

IT is with real pleaſure, that I embrace this opportunity of preſenting through you to the American Philoſophical Society the following aſtronomical and miſcellaneous obſervations, made on the boundary between the United States, and His Catholic Majeſty.

So far as this addreſs can be conſidered as a mark of reſpect, you are entitled to it from the ſervices you have rendered this country, in the uniform attention, and the judicious manner, in which you have diſcharged the laborious duties, of profeſſor of the mathematicks in the univerſity of Pennſylvania: But excluſive of this, you are entitled to it from me in a more particular manner, as the preceptor of my youth, and at all times ſince, my diſintereſted friend.

I feel a confidence that any errors, or inaccuracies, which may be found in the following work, will not only meet with your indulgence, but with that of every other perſon of ſcience, acquainted with the difficulties under which I laboured.—To William Dunbar, Eſq. of the Miſſiſſippi Territory I feel myſelf under the greateſt obligations, for his aſſiſtance during the ſhort time he was with us; his extenſive ſcientific acquirements, added to a ſingular facility in making mathematical calculations, would have reduced my labour, to a mere amuſement, if he had continued.—To my aſſiſtants Meſſrs. Gilleſpie, Ellicott, junr. and Walker, the former of whom acted as ſurveyor,

veyor, I have likewiſe to acknowledge my obligations, for the promptitude with which they executed the orders, they received, and the aid they gave me in making the obſervations.

An Account of the Apparatus uſed on the Boundary between the United States and His Catholic Majeſty.

On behalf of the United States we had,

1ſtly, One zenith ſector of nearly ſix feet radius ſimilar to the one made by Mr. Graham for Dr. Bradley and Mr. Molyneux, with which the aberration of the ſtars, and nutation of the earth's axis were diſcovered, and the quantities determined.

2dly, Another zenith ſector of 19 inches radius to be uſed when the utmoſt accuracy was not neceſſary, and where the tranſportation of the large one could not be effected without great expenſe and difficulty. Theſe inſtruments were principally executed by my late worthy, and ingenious friend Mr. Rittenhouſe, except ſome additions which I have made myſelf. The plumb lines of both ſectors are ſuſpended from a notch above the axis of the inſtruments, in the manner deſcribed by the Rev. Dr. Maſkelyne the preſent Aſtronomer Royal at Greenwich, in the introduction to the firſt volume of his Aſtronomical Obſervations. A particular deſcription of thoſe inſtruments is rendered unneceſſary, by being accurately done in a number of ſcientific works, particularly by M. de Maupertuis in his account of the meaſurement of a degree of the meridian under the arctic circle. The ſector is of all inſtruments the beſt calculated for meaſuring zenith diſtances which come within its arch. The large

large one above mentioned extends to 5 degrees north, and ſouth of the zenith, and the ſmall one to between 8 and 9 degrees. Stars when ſo near the zenith are inſenſibly affected by the different refractive powers of the atmoſphere ariſing from its different degrees of denſity, add to this that the error of the viſual axis is completely corrected by taking the zenith diſtances of the ſtars with the plane, or face of the inſtrument both eaſt and weſt.

3dly. A large acromatic teleſcope made by Mr. Dolland of London, which excluſive of a terreſtrial eye piece which magnifies about 60 times has three other eye pieces for celeſtial purpoſes, the magnifying powers are 120, 200, and 300, the firſt I generally uſed. This inſtrument for producing a well defined clear image is exceeded but by few reflectors.

4thly. A tranſit and equal altitude inſtrument, which I conſtructed and executed in the year 1789, and uſed in running the weſtern boundary of the ſtate of New York, and afterwards in running the boundaries of the diſtrict of Columbia, and the principal avenues in the city of Waſhington. It is mentioned in the 4th Vol. of the Tranſactions of the American Philoſophical Society, No. 6. page 49.

5thly. Two acromatic teleſcopes for taking ſignals with ſliding tubes, one of them drew out to upwards of 4 feet, and the other to about 15 inches,—the latter for its length is remarkably good, it ſhews the ſatellites of Jupiter very diſtinctly.

6thly. A regulator which I executed in the year 1784.

7thly. An inſtrument of 8 inches radius for taking horizontal angles, made by the late Mr. George Adams of London, and ſimilar to the one deſcribed by M. de Maupertuis in the work already mentioned.

8thly. Three braſs ſextants; one of them executed by Mr. Ramſden in a ſuperior ſtyle. It is 7 inches radius, and by the vernier divides to 20 ſeconds, which may be

again ſubdivided with eaſe by the eye, aided with the microſcope. This ſextant I uſed in taking all the lunar diſtances.

9thly. A ſurveying compaſs made by Mr. Benjamin Rittenhouſe upon the neweſt, and moſt approved plan.

10thly. Two excellent ſtop watches, with ſecond hands, to be uſed if any accident ſhould happen to the regulator, or at places to which it could not be taken.

11thly. Two excellent caſes of drawing, and plotting inſtruments.

12thly. Two copper lanterns to be uſed in tracing meridians, and giving the direction of lines when determined in the night by celeſtial obſervation. Thoſe lanterns had four ſides, each ſide about $4\frac{1}{2}$ inches wide, and 8 inches high: in the front of each is a ſlit, or aperture of about 5 inches in length, and 3 tenths of an inch in breadth; through which a lighted candle is to be ſeen in the night. To render this ſlit, or aperture more conſpicuous in day-light, a ſlip of white paper was ſometimes faſtened to the copper on each ſide of it, and at others a piece of white paper was placed behind the lantern, which rendered the aperture very diſtinct, when the door which is on the oppoſite ſide to the aperture was opened. L. L. L. Plate V. are different views of the lanterns.

13thly. An apparatus to ſecure the water in uſing the artificial horizon againſt the effects of the wind: As an accurate knowledge of the time, is of the utmoſt conſequence in aſtronomy, it is abſolutely neceſſary that the obſervations for that purpoſe be made with certainty. On this account I ſhall be more particular in deſcribing the method I have purſued for fifteen years, without finding it liable to any objection of weight. It is well known that equal altitudes of the ſun, or ſtars, afford the readieſt method of obtaining the time for occaſional purpoſes, and at land thoſe equal altitudes muſt be taken from an artificial horizon if a quadrant, or ſextant be uſed. It is

therefore

therefore neceſſary that the water, or any other fluid made uſe of ſhould be entirely free from any undulation both fore, and afternoon, when the obſervations are made, which will not be the caſe if the ſurface is expoſed even to a very light breeze, to effect this purpoſe I have made uſe of the following apparatus, viz.

Plate V. Fig. 1. repreſents a tin cup, about 2 inches deep, 5 inches long, and 3 wide; it is well to have the bottom made heavy by fitting ſome lead in it. This cup is to be filled with water and the wind kept from it by covering it with the roof (Fig. 2.) the ends, and lower parts of which are made of tin, and the principal part of the ſides, or inclined planes are of talc or iſinglaſs; which ſhould be of a good quality, and rendered ſufficiently thin by ſeparating, and taking off a number of laminæ with the point of a penknife. The lower part of the roof ſhould be ſo conſtructed, as to go down into the cup about 3 tenths of an inch. The degree of inclination of the planes, forming the two ſides of the roof is of little importance. The planes of the one I have always uſed ſtand nearly at right angles to each other. The lower part of the roof ſhould go eaſily into the cup, becauſe it ſometimes happens that the evaporation from the water, will be ſo abundant as to cover the iſinglaſs, and render the image of the ſun which is reflected from the water obſcure: in that caſe the roof muſt be removed a few ſeconds of time, and the particles of water on the iſinglaſs will diſappear. As the iſinglaſs when properly reduced will be very thin, and conſequently tender and delicate, it is neceſſary that it ſhould be defended againſt accidents when not in uſe, for this purpoſe a caſe of tin ſuch as repreſented by Fig. 3. will be found convenient. The equal altitudes in the following work, with a few exceptions, were taken with ſextants, ſometimes by three perſons following each other as quick as poſſible, the

correſponding forenoon, and afternoon obſervations, were added up in ſeparate ſums, and divided by the number of terms for the means, by which they were reduced to a ſingle expreſſion, as entered in the journal or diary. The three ſextants gave nine obſervations, and it frequently happened that the extremes of the nine obſervations, did not differ more than 1 or 1½ ſeconds. After the forenoon obſervations were made, the ſextants were carefully laid away, care being taken not to touch the indexes till the afternoon obſervations were completed.

14thly. Two two-pole chains of the common conſtruction.

The apparatus on the Spaniſh ſide was much leſs conſiderable.: It conſiſted of the following inſtruments.

1ſt. An excellent ſextant, which graduated by the vernier to 10 ſeconds: It was preſented by William Dunbar, Eſq. to Governor Gayoſo, after my arrival in that country.

2dly. An aſtronomical circle executed by Mr. Traughton of London, for the above mentioned William Dunbar, and ſold by him to Governor Gayoſo to be uſed on the boundary. This inſtrument is in itſelf a portable obſervatory, and executed in a maſterly manner;—the different circles are by the vernier divided into 5 ſeconds, and may very eaſily by the eye, aided with the microſcope be again ſubdivided. The graduations appear to be perfect, ſo far as human dexterity extends. This inſtrument was ſent away a few days before the Indians made an attack upon us at the mouth of Flint River.

3dly. An old ſurveying compaſs very ſlightly made, and was for a ſhort time accommodated with a wooden ſight, which was done (with conſiderable dexterity) by Mr. Patrick Taggert, a deputy ſurveyor on the Spaniſh ſide, who was very uſeful in every ſtage of the buſineſs.

Obſervations

Obfervations made with the fix-feet Zenith Sector on Union Hill near the Miffiffippi river, for determining the firft point in the boundary between the United States, and His Catholic Majefty's provinces of Eaft and Weft Floridas.

Face of the Sector Weft.

1798.			°	′	″	
May 6th.	Obferved zenith diftance of	α Andromedæ	3	2	11	S.
	do.	Caftor	1	18	33.5	N.
	do.	Pollux	2	30	19	S.
7th.	do.	α Andromedæ	3	2	12.8	S.
	do.	Caftor	1	18	33.3	N.
	do.	Pollux	2	30	19.5	S.
	do.	β Pegafi	4	1	15	S.
8th.	do.	α Andromedæ	3	2	12.6	S.
	do.	Pollux	2	30	18.6	S.
	do.	β Pegafi	4	1	13.5	S.
	do.	α Coro. Borealis	3	36	28.8	S.
9th.	do.	Caftor	1	18	33.2	N.
	do.	β Pegafi	4	1	16.3	S.
	do.	α Coro. Borealis	3	36	26.2	S.

Face of the Sector Eaft

			°	′	″	
10th.	Obferved zenith diftance of	β Pegafi	3	59	37.5	S.
11th.	do.	α Coro. Borealis	3	34	44	S.
12th.	do.	α Andromedæ	3	0	32	S.
	do.	Caftor	1	20	10	N.
	do.	Pollux	2	28	38	S.
	do.	α Coro. Borealis	3	34	46	S.
13th.	do.	α Andromedæ	3	0	31	S.
	do.	Caftor	1	20	8.8	N.
	do.	Pollux	2	28	38	S.
	do.	β Pegafi	3	59	40.5	N.
14th.	do.	α Andromedæ	3	0	34	S.
	do.	α Coro. Borealis	3	34	47	S.
15th.	do.	α Andromedæ	3	0	35	S.
	do.	Caftor	1	20	12	N.
	do.	Pollux	2	28	40	S.
16th.	do.	β Pegafi	3	59	40	S.

Refult

Reſult of the foregoing Obſervations.

Face of the Sector Weſt.

The foregoing Obſerved Zenith Diſtances when arranged ſtand as below.

1798.	α Andromedæ. ° ′ ″	Caſtor. ° ′ ″	Pollux. ° ′ ″	β Pegaſi. ° ′ ″	α Coro. Borealis. ° ′ ″
May 6th.	3 2 11 s.	1 18 33.5 N.	2 30 19 s.	....	....
7th.	3 2 12.8	1 18 33.3	2 30 19.5	4 1 15 s.	....
8th.	3 2 12.6	....	2 30 18.6	4 1 13.5	3 36 28.8 s.
9th.	....	1 18 33.2	....	4 1 16.3	3 36 26.2
Means	3 2 12.1 s	1 18 33.3 N.	2 30 19.1 s.	4 1 14.9 s.	3 36 27.5 s.
Face of the Sector Eaſt.					
10th.	....	....	....	3 59 37.5 s.	....
11th.	....	....	....	....	3 34 44 s.
12th.	3 0 32 s.	1 20 10 N.	2 28 38 s.	....	3 34 46
13th.	3 0 31	1 20 8.8	2 28 38	3 59 40.5	....
14th.	3 0 34	....	....	....	3 34 47
15th.	3 0 35	1 20 12	2 28 40	....	....
16th.	....	....	....	3 59 40	....
Means	3 0 33 s.	1 20 10.3 N.	2 28 38.7 s.	3 59 39.3 s.	3 34 45.7 s.
Means face of the Sector weſt	3 2 12.1 s.	1 18 33.3 N.	2 30 19.1 s.	4 1 14.9 s.	3 36 27.5 s.
Correct obſerved zenith diſtances	3 1 22.5 s.	1 19 21.8 N.	2 29 28.9 s.	4 0 27.1 s.	3 35 36.6 s.
Refractions	+ 3.0	+ 1.3	+ 2.5	+ 4	+ 3.5
True zenith diſtances	3 1 25.5 s	1 19 23.1 N.	2 29 31.4 s.	4 0 31.1 s.	3 35 40.1 s.
Mean declination, on the 10th May	27 58 38 N.	32 18 54.4 N.	28 30 1.6 N.	26 59 26.5 N.	27 24 8.2 N.
Aberrations	— 13.2	+ 4.4	+ 3.5	— 12.7	— 4.4
Nutations	— 4.1	+ 8.7	+ 8.7	— 6.1	+ 0.8
Semi. ann. equations	— 0.5	....	....	— 0.5	+ 0.4
True declinations	27 58 20.2 N.	32 19 7.5 N.	28 30 13.8 N.	26 59 7.2 N.	27 24 5 N.
True zenith diſtances applied	+3 1 25.5 s.	−1 19 23.1 N.	+2 29 31.4 s.	+4 0 31.1 s.	+3 35 40.1 s.
Latitudes	30 59 45.7 N.	30 59 44.4 N.	30 59 45.2 N.	30 59 38.3 N.	30 59 45.1 N.

Latitude

		°	′	″
Latitude by	α Andromedæ .	30	59	45.7
do. .	Caſtor . .	30	59	44.4
do. .	Pollux . .	30	59	45.2
do. .	β Pegaſi . .	30	59	38.3
do. .	α Coro. Borealis .	30	59	45.1
Mean Latitude north . .		30	59	43.74

From the reſult of the above obſervations it appears that the obſervatory was 16″ 26 or about one thouſand, ſix hundred and forty-four feet and eight-tenths of a foot Engliſh meaſure too far ſouth, which diſtance was laid off to the north on a meridional line drawn from the obſervatory O to the point A, (ſee Plate V. Fig 4.). The point A is in a deep hollow, or chaſm.—From the point A a viſta was opened both to the eaſt and weſt, and as near at right angles to the meridian as poſſible: but the point A being too low for doing it with certainty, the elevated poſition B eaſt from A, and diſtant thirty-four perches, was pitched upon as the moſt proper place for commencing our operations. The tranſit inſtrument was accordingly put up at B, and the perpendicular or vertical fibre of the teleſcope, was brought to deſcribe the prime vertical by taking equal altitudes of Arcturus.—This was effected in the following manner: a piece of timber T, flatted on the upper ſide, was placed at the point C, diſtant from B ſeventy-one perches, and at right angles to the viſta; on this piece of timber at U, one of the copper lanterns already deſcribed was placed on the 18th in the afternoon; the tranſit inſtrument being previouſly adjuſted, and the vertical fibre which was a ſingle thread of ſpider's web, being brought to biſect the aperture in the front of the lantern —A few minutes before the ſtar in its aſcent was expected to appear in the field of the teleſcope, it was elevated about forty-one and an half degrees: immediately upon the ſtar's making its appearance, the horizontal fibre of the teleſcope was brought to biſect it, and kept upon it by gradually elevating the inſtrument until the ſtar arrived at the interſection of the fibres, at that inſtant the elevating arc was faſtened, and afterwards the clamp of the perpendicular axis was looſened. On the morning of the 19th, the level of the inſtrument was carefully examined and adjuſted. A ſhort time before the ſtar was expected to appear in the field of the teleſcope, in its deſcent, the teleſcope was directed weſt: as ſoon as the ſtar appeared in the field, the clamp was faſtened and the vertical fibre brought to biſect the ſtar, and kept upon it by the ſcrews which direct the arm of the clamp until it arrived at the interſection of the fibres.—The elevating arc was then looſened, and the teleſcope taken out of the Y's and reverſed; a lighted candle having been previouſly put into another lantern ſimilar to the firſt, and placed on the ſame piece of timber. The aperture of the ſecond lantern was brought into the direction of the vertical fibre (which ſuppoſe to be at *n*) by an aſſiſtant at C, who received the neceſſary ſignals for that purpoſe from the obſerver at B.—In the forenoon of the ſame day the diſtance between the apertures of the two lanterns was carefully biſected, which

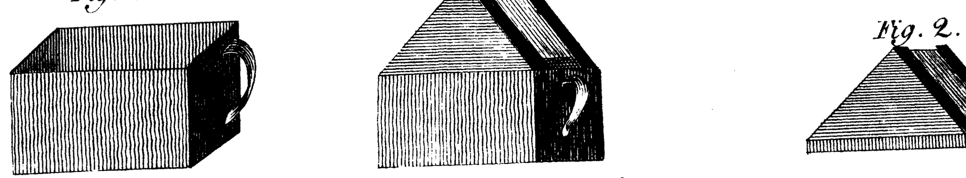
which ſuppoſe to be at S. The firſt lantern was then removed and the aperture brought to coincide with the point of biſection. In the afternoon of the ſame day, the vertical fibre of the teleſcope being brought to biſect the aperture of the lantern at S, Arcturus was again obſerved in its aſcent, and the morning following in its deſcent.—The inſtrument was reverſed as in the firſt caſe, and the aperture of the ſecond lantern which was now put on the flatted piece of timber V, placed about 18 inches below the firſt, and brought truly into the direction of the vertical fibre by an aſſiſtant.—The candle in the firſt lantern at S was then lighted, and the flames of both were biſected by the vertical fibre. Being by this obſervation convinced, that the teleſcope moved accurately in the prime vertical, the line was then opened weſt with that direction, the diſtance of two hundred and thirty-five perches to high water mark : as the inſtrument then deſcribed the prime vertical, the offset into the parallel of latitude, (which became a tangent to the arc), was laid off to the north, being two and an half inches, where a hewn poſt was ſet up and ſurrounded by a mound of earth.—At S, the tangent of an angle of 2′ 36″ 45‴ having BC for its baſe was laid off to the north by meaſuring from the middle of the aperture of the lantern, the diſtance of 10.68 inches, at the termination which ſuppoſe to be at *r*, a fine mark was placed, which the verticle fibre was brought to biſect.—This mark gave the direction of an arc, which continued the diſtance of ten miles, would again interſect the parallel of latitude, which would then become a chord to the arc, and the offsets be to the ſouth, and fall within the viſta we were opening : by taking ſo ſmall an arc, the trouble and expence of opening two lines through one of the moſt impenetrable countries in the world was avoided.

	Ft.	In.	
At the termination of the firſt mile which was 85 perches eaſt of the tranſit ſtation at B an offset of	1	0	was laid off to the ſouth.
At the termination of the ſecond mile	4	5	do.
do. . of the third .	7	0	do.
do. . of the fourth .	8	9	do.
do. . of the fifth .	9	9	do.
do. . of the ſixth .	9	11	do.
do. . of the ſeventh .	9	4	do.
do. . of the eighth .	8	8	do.
do. . of the ninth .	5	9	do.
do. . of the tenth .	2	9	do.

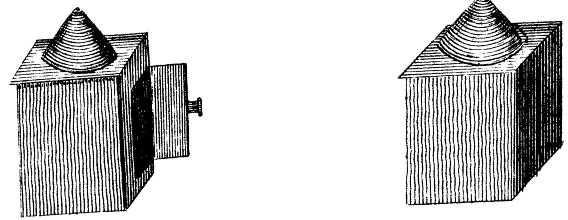
On the 17th of July, we moved our camp to Big Bayou Sara, about 37″ north of the parallel of 31° and 9.6 perches eaſt of the ten mile poſt. On the 19th ſet up the clock, and prepared to obſerve ſuch of the eclipſes of ♃'s ſatellites as ſhould be viſible while we continued at that ſtation.

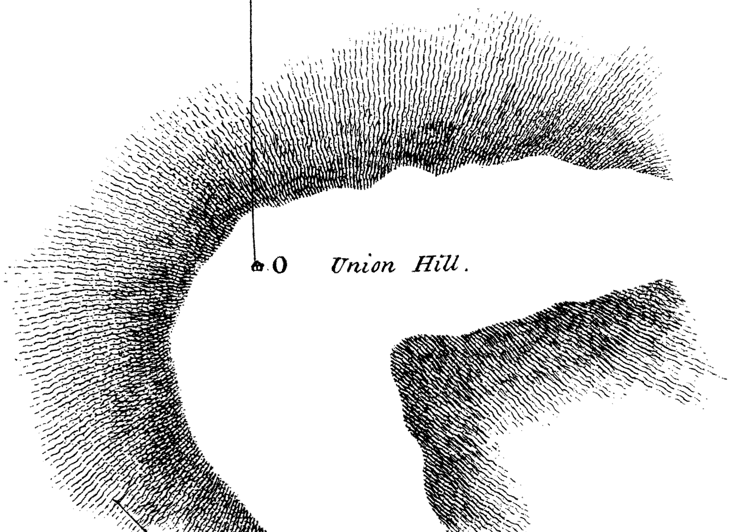
Aug.

Fig. 2.



The cup with the roof on it.





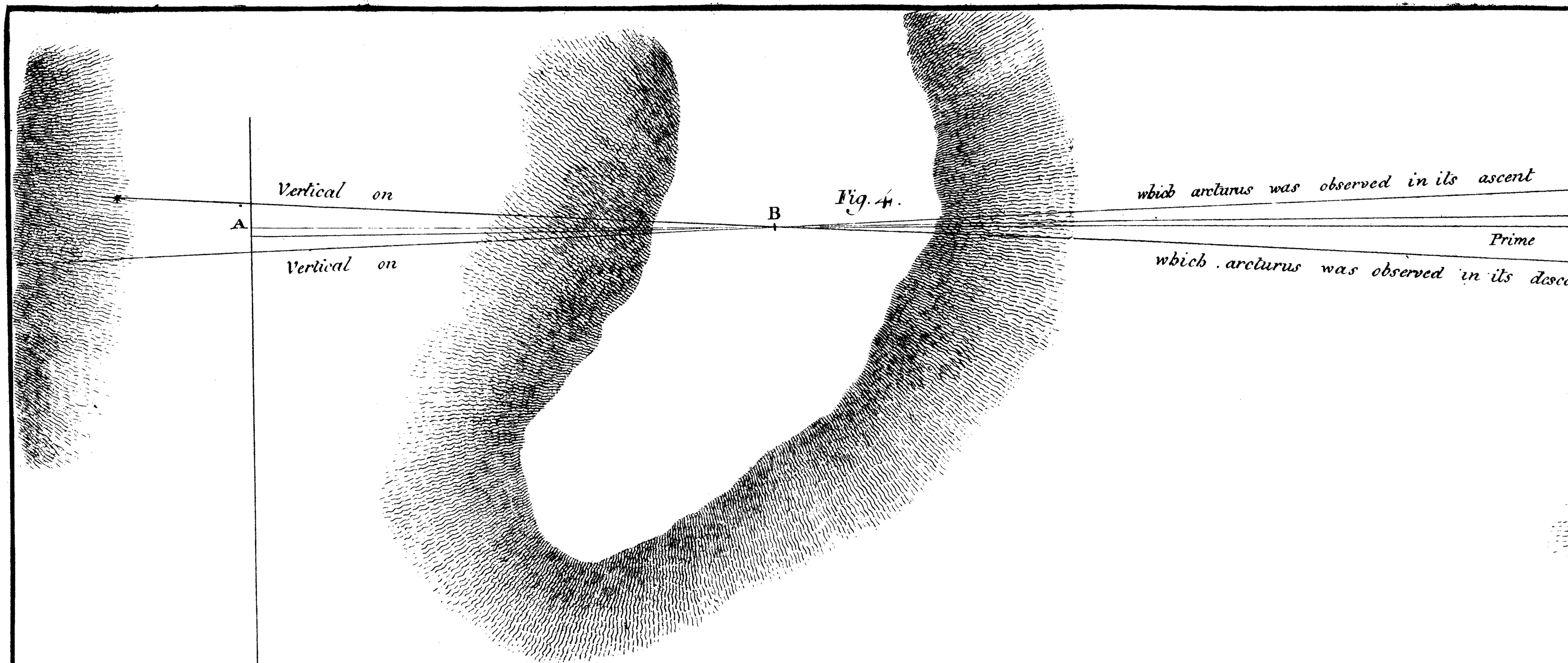
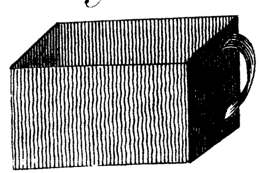
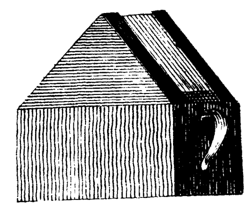


Fig. 4.

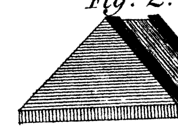
Fig. 1.

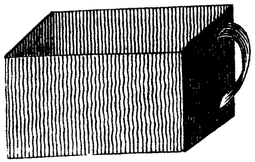


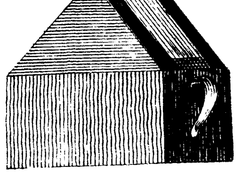


The cup with the roof on it.

Fig. 2.







The cup with the roof on it.

Fig. 2.

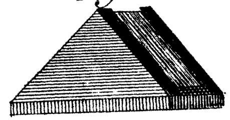
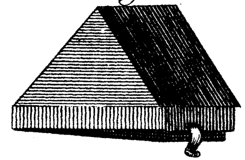
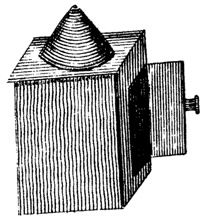


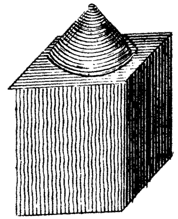
Fig. 3.



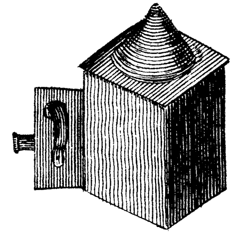
L



L



L



Engrav'd by B.Jones.

№ 1.

Fig. 4.

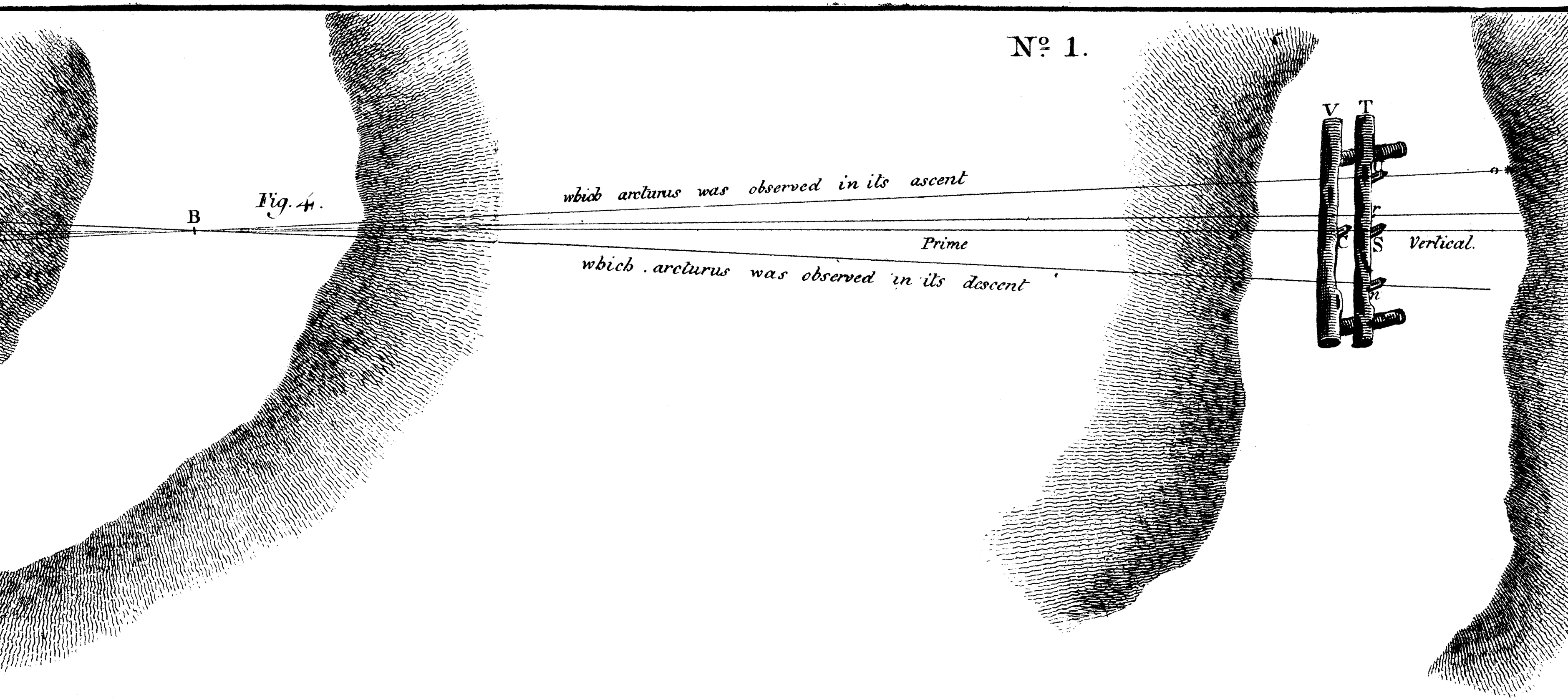
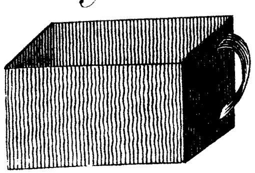
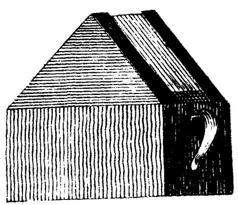


Fig. 1.





The cup with the roof on it.

Fig. 2.

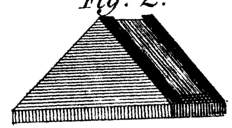
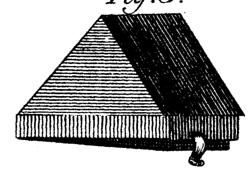


Fig. 3.



Aug. 2d. *Equal altitudes of the Sun.**
A. M. 8^h 9′ 35″. P. M. 3^h 46′ 56″.

Prepared to observe an immersion of the 1st satellite of ♃.—At 13^h 43′ a small cloud began to obscure the moon, but ♃ and his satellites continued very bright till about 13^h 44′ 26″ when the 1st satellite began to lose its lustre; At 13^h 44′ 35″ the cloud which appeared over the moon, extended itself almost instantaneously over the whole hemisphere, and obscured the stars and planets.

5th. *Equal altitudes of the Sun.*
A. M. 8^h 6′ 41″. P. M. 3^h 48′ 19″.

8th. *Equal altitudes of the Sun.*
A. M. 7^h 57′ 19″. P. M. 3^h 56′ 2″.

9th. *Emersion* of the 2d satellite of ♃ observed at 13^h 13′ 9″. The planet and his satellites middling bright. Magnifying power of the telescope 120.

On the 6th and 9th of this month, at the distance of 9 miles and ninety perches from the first transit station B, and distant from the point D Plate VI. 10 miles and 5 perches, equal altitudes of α Delphini were taken in the same manner, as already related with Arcturus, to determine the direction of our arc, which on a base of 212.5 perches, was 31 inches south of the prime vertical, which is equal to an angle of 2′ 31″ 6‴.—This angle ought to have been but 2′ 13″ 59‴, the difference 0′ 17″ 7‴ was therefore the error of the arc to the south. Now suppose this error to have been gradually accumulating, which is very probable, it would at the distance of 9 miles and 90 perches, (the space between the transit stations), have carried the arc about 2 feet too far to the south: But the transit at the distance of 9 miles and 90 perches from the first station, ought to have been 2 feet and 7 inches north of the parallel, the difference therefore of 7 inches is the distance of the transit to the north of the parallel at its second station, and which is included in the offsets for the second arc to the termination of 18 miles, and 118 perches from the point D.—On the 9th another arc for 10 miles was laid off, making an angle of 2′ 36″ 45‴ with the prime vertical. The base was 212.5 perches east, and the perpendicular 32 inches north from the aperture of the lantern.

12th. *Equal altitudes of the Sun.*
A. M. 8^h 6′ 48″. P. M. 3^h 47′ 7″.

* The equal altitudes of the sun, and his passage over the meridian with the thermometrical observations when they occur, are entered according to the civil account, the others according to the mode of astronomers.

15th. *Equal altitudes of the Sun.*
A. M. $8^h\ 32'\ 55''$ P. M. $3^h\ 15'\ 55''$

16th. *Immersion* of the 2d satellite of ♃ observed at $13^h\ 22'\ 45''$
Emersion . do. . . 15 48 16
The night clear, Belts distinct, magnifying power 120.

17th. *Equal altitudes of the Sun.*
A. M. $8^h\ 14'\ 57''$ P. M. $3^h\ 32'\ 27''$

23d. *Equal altitudes of the Sun.*
A. M. $8^h\ 23'\ 8''$. P. M. $3^h\ 19'\ 54''$.

Immersion of the 2d satellite of ♃ observed at $15^h\ 58'\ 25''$. Belts distinct, magnifying power 120.

30th. *Equal altitudes of the Sun.*
A. M. $8^h\ 22'\ 40''$. P. M. $3^h\ 14'\ 34''$.

31st. Clock ran down in the morning, wound it up and set it a-going, and took the following

Equal altitudes of the Sun.
A. M. $9^h\ 42'\ 22''.5$. P. M. $2^h\ 26'\ 11''$.

Sept. 1st. *Equal altitudes of the Sun.*
A. M. $8^h\ 28'\ 47''$. P. M. $3^h\ 38'\ 54''$.

Immersion of the 1st satellite of ♃ observed at $15^h\ 58'\ 50''$. Belts very distinct, magnifying power 120.

2d. *Equal altitudes of the Sun.*
A. M. $8^h\ 29'\ 15''$. P. M. $3^h\ 37'\ 32''$.

This was the last observation made at Bayou Sara.

Result

Reſult of the equal altitudes of the Sun taken at Bayou Sara.

			′	″	Daily loſs. ″
Clock too ſlow mean time	Aug.	2d.	7	28.3	
do.		5th.	7	57.6	9.8
do.		8th.	8	25.1	9.2
do.		12th.	9	1.7	9.1
do.		15th.	9	31.0	9.5
do.		17th.	9	49.4	9.2
do.		23d.	10	33 9	7.4
do.		30th.	11	27.5	7.7

Clock ran down early in the morning of the 31ſt, wound it and ſet it a-going.

			′	″	Daily loſs. ″
Clock too faſt mean time	Aug.	31ſt.	4	30	
do.	Sept.	1ſt.	4	23.3	6.7
do.		2d.	4	15.7	7.6

Longitude deduced from the eclipſes of Jupiter's ſatellites, obſerevd at Bayou Sara.

				h	′	″	
Auguſt	9th.	Emerſion of the 2d ſatellite		6	3	17	Weſt from Greenwich.
	16th.	Immerſion of	do.	6	3	3	
		Emerſion of	do.	6	3	58	
	23d.	Immerſion	do.	6	4	27	
Sept.	1ſt.	Immerſion of the 1ſt	do.	6	5	21	

When the firſt point of latitude was determined on the Miſſiſſippi, the annual inundation prevented our approaching the banks of the river: But on the 28th of July, the waters having ſubſided it was mutually agreed that William Dunbar, Eſq. his Catholic Majeſty's aſtronomical commiſſioner, ſhould proceed to the point D at high water mark, and extend the line from that point to the eaſtern bank of the river aforeſaid, which he completed on the 18th of Auguſt, and whoſe report is in the following words.

"On the 28th of July, the line then approaching the 10th mile, and learning that the waters of the inundation were retired within the banks of the Miſſiſſippi, ſo that the lands were become ſufficiently dry to give firm footing to the labourers, the aſtronomer for His Catholic Majeſty taking upon himſelf the extending of the line through the river low ground to the eaſtern margin of the Miſſiſſippi. The party allotted for this ſervice did accordingly encamp at the point D, puſhing the line forward in continuation of the tangent commencing at the point B. Judging the preſent a convenient poſition for verifying the direction of the line, the aſtronomer for His Catholic Majeſty eſtabliſhed his obſervatory near the point D, and made the following obſervations with the circular inſtrument* placed in the direction of the tangent, viz.

* The aſtronomical circle already mentioned.

"On the astronomical 15th of August were taken equal altitudes of the star τ Pegasi the eastern observatory* being made precisely on the vertical arc corresponding to the line, and the second to the westward being completed, and the circle with its telescope reversed, the axis of the instrument was found to make an angle to the south of 20″ with the lantern placed carefully in the direction of the line, and consequently the direction of the line at the observatory is 10″ to the north of east. The distance of the observatory from the point B is 3430 French feet,† therefore by calculation the line passing through the observatory makes an angle of 21″ 41‴ northerly with due east: But by observation this angle is only 10″, hence it would appear that the line inclines too much to the south by the quantity of 11″ 41‴, which in running 100 miles would cause a deviation of nearly 28 French feet. So small a difference between the two sets of observations, may well arise from the imperfection of instruments, combined with the unavoidable errors of observation.

"The line being extended to the margin of the Mississippi on the 17th of August, the measurement from the point D was found to be 2 miles and 180 perches English measure, or 2111.42 French toises. At the distance of 1 and 2 miles at the points *x* and *y*, were erected square posts surrounded by mounds of earth, and at the distance of 88 French feet from the margin of the river, and in the parallel of latitude was erected a square post 10 feet high surrounded by a mound of eight feet in height. On this post is inscribed on the south side a crown with the letter R underneath; on the north U. S. and the west fronting the river, Agosto 18th, 1798. Lat. 31° N. In erecting the mile posts, due regard was paid to the quantity of the offsets to the north of the tangent, and are by calculation as follows,

	Distance from the point B.						*Offsets*			*Offsets*		
	French Measure.			*English Measure.*			*English Measure*			*French Measure.*		
Mounds.	Toises.	Feet.	Tenths.	Miles.	Perches.	Feet.	Feet.	Inches.	Tenths.	Feet.	Inches.	Lines.
D	602	3.	2	0	234	0	0	2.6		0	2.5	
x	1426	2.	0	1	234	0	1	2.4		1	1.6	
y	2250	1.	8	2	234	0	2	11.86		2	9.7	
z	2690	0.	7	3	88	4	4	3.6		4	0.4"	

On Monday the 20th of August, the astronomer for His Catholic Majesty returned with his party to camp at Bayou Sara.

On

* The point B.

† Mr. Dunbar's observatory, was a short distance east of the point D, which is at the foot of a steep hill.

On the firſt day of September following, William Dunbar, Eſq. after making the foregoing report declined any further ſervice and returned home.

Sept. 3d. Moved our camp to Thompſon's creek, diſtant from the point D at high water mark 18.75 miles.

4th. Cleaned the clock, and ſet it up againſt the ſtump of a tree, which was left high, and prepared for that purpoſe.

7th. *Equal altitudes of the Sun.*

A. M. $8^h\ 25'\ 42''.5$. P. M. $3^h\ 33'\ 19''$.

8th. *Equal altitudes of the Sun.*

A. M. $8^h\ 18'\ 16''.5$ P. M. $3^h\ 40'\ 29''$.

9th. *Equal altitudes of the Sun.*

A. M. $8^h\ 22'\ 50''$. P. M. $3^h\ 35'\ 28''$.

10th. *Equal altitudes of the Sun.*

A. M. $8^h\ 21'\ 27''$. P. M. $3^h\ 36'\ 28''$.

Immerſion of the 2d ſatellite of ♃ obſerved at $10^h\ 45'\ 8''$
do. . 1ſt. . do. . 12 19 11
The night remarkably fine, belts very diſtinct, magnifying power 120.

11th. *Equal altitudes of the Sun.*

A. M. $8^h\ 28'\ 9''$. P. M. $3^h\ 29'\ 20''$.

12th. *Equal altitudes of the Sun.*

A. M. $8^h\ 18'\ 12''$. P. M. $3^h\ 38'\ 45''$.

13th. *Equal altitudes of the Sun.*

A. M. $8^h\ 12'\ 38''.5$. P. M. $3^h\ 43'\ 51''$.

16th.

16th. *Equal altitudes of the Sun.*

A. M. $8^h\ 18'\ 13''.5$. P. M. $3^h\ 36'\ 44''.5$.

17th. *Equal altitudes of the Sun.*

A. M. $8^h\ 47'\ 33''$. P. M. $3^h\ 6'\ 57''.5$.

Immerſion of the 2d ſatellite of ♃ obſerved at $13^h\ 23'\ 35''$
do. . 1ſt . do. . 14 14 1
Night clear, belts diſtinct, magnifying power 120.

19th. *Equal altitudes of the Sun.*

A. M. $9^h\ 3'\ 50''.5$. P. M. $2^h\ 49'\ 39''.5$

23d. *Equal altitudes of the Sun.*

A. M. $9^h\ 4'\ 3''$. P. M. $2^h\ 47'\ 37''$.

24th. *Equal altitudes of the Sun.*

A. M. $8^h\ 49'\ 57''$. P. M. $3^h\ 1'\ 23''.5$.

Immerſion of the 2d ſatellite of ♃ obſerved at $16^h\ 2'\ 1''$
do. . 1ſt . do. . 16 8 40
Night clear, belts diſtinct, magnifying power 120.

25th. *Equal altitudes of the Sun.*

A. M. $8^h\ 46'\ 32''.5$. P. M. $3^h\ 4'\ 22''.5$.

26th. *Equal altitudes of the Sun.*

A. M. $8^h\ 44'\ 54''$. P. M. $3^h\ 5'\ 41''$.

Immerſion of the 1ſt ſatellite of ♃ obſerved at $10^h\ 37'\ 10''$
do. . 3d . do. . 11 28 32
Emerſion do. . do. . 13 15 40
Night fine, belts diſtinct, magnifying power 120.

The

The arc being now extended to the weſt ſide of Thompſon's creek, the following offsets into the parallel of latitude were laid off, viz.

				F.	In.	
At the termination of the	11th	mile an offset of		4	2	to the ſouth.
do.	12	do.		6	11	do.
do.	13	do.		8	11	do.
do.	14	do.		10	2	do.
do.	15	do.		10	7	do.
do.	16	do.		10	3	do.
do.	17	do.		9	0	do.
do.	18	do.		7	0	do.

Took equal altitudes of τ Pegaſi, to determine the direction of our arc, which at the diſtance of 206 perches eaſt from the tranſit, was 19.35 inches ſouth of the prime vertical, which ſubtends an angle of 1′ 40″ 48‴. The tranſit was 8 miles and 118 perches eaſt from its ſecond ſtation, which diſtance ſhould have given an angle of 1′ 44″ 52‴, hence it appears, that the arc was directed too far north by 4″ 4‴ on a ſuppoſition that this was gradually accumulating, the tranſit was too far north by 6.8 inches, which is accounted for in the offsets for the 19th, 20th, and 21ſt miles.

27th. Re-examined the direction of our arc by taking equal altitudes of the ſame ſtar, the coincidence was leſs than 1½″ which was probably occaſioned by an imperfection inſeparable from obſervations: this ſmall difference was biſected and the diſtance of 20.8 inches was laid off from the point of biſection to the ſouth, and the arc continued through its termination as in the former caſes.

29th. Clock ran down in the night.

30th. Wound up the clock and ſet it a-going.

Oct. 7th. *Equal altitudes of the Sun.*
A. M. $8^h\ 36'\ 1''$. P. M. $3^h\ 21'\ 44''$.

19th. *Equal altitudes of the Sun.*
A. M. $8^h\ 27'\ 29''$. P. M. $3^h\ 27'\ 50''$.

Immerſion of the 1ſt ſatellite of ♃ obſerved at $10^h\ 55'\ 31''$
do. . 2d . do. . 13 21 15
Night very fine, belts diſtinct, magnifying power 120.

20th.

20th. *Equal altitudes of the Sun.*

	h ′ ″		h ′ ″
A. M.	9 30 6.5.	P. M.	2 25 5.

End of the aſtronomical obſervations made at Thompſon's creek.

The following offsets complete the work done with the Tranſit inſtrument, viz.

			F.	In.	
At the termination of the	19th mile	an offset of	4	3	was laid off to the S.
do.	20	do.	1	2	do.
do.	21	do.	3	1	to the North.

Reſult of the equal altitudes of the Sun taken at Thompſon's creek.

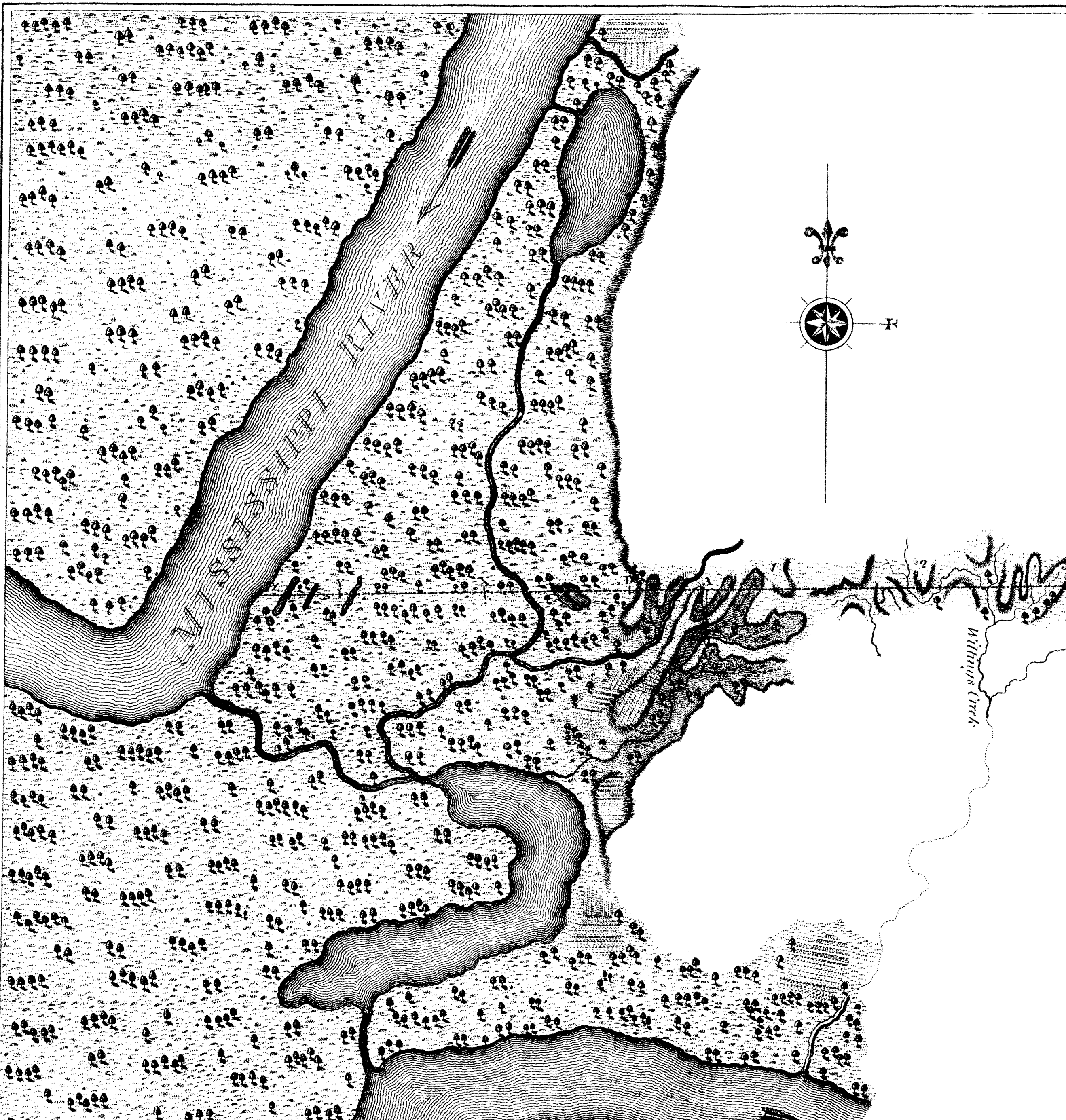
		′	″	Daily gain. ″
Clock too faſt mean time Sept.	7th.	2	1.8	doubtful 13.0
do.	8th.	2	14.8	6.5
do.	9th.	2	21.3	8.8
do.	10th.	2	30.1	7.8
do.	11th.	2	37.9	4.7
do.	12th.	2	42.6	7.4
do.	13th.	2	50.0	5.7
do.	16th.	3	7.2	7.0
do.	17th.	3	14.2	5.9
do.	19th.	3	26.1	7.1
do.	23d.	3	54.7	11.1
do.	24th.	4	5.8*	8.4
do.	25th.	4	13.2	11.7
do.	26th.	4	24.9	

Clock ran down on the 29th, was ſet a-going on the 30th.

		′	″	Daily gain. ″
Clock too faſt mean time Oct.	6th.	11	14.1	9.3
do.	7th.	11	23.4	7.5
do.	19th.	12	53	5.5
do.	20th.	12	58.5	

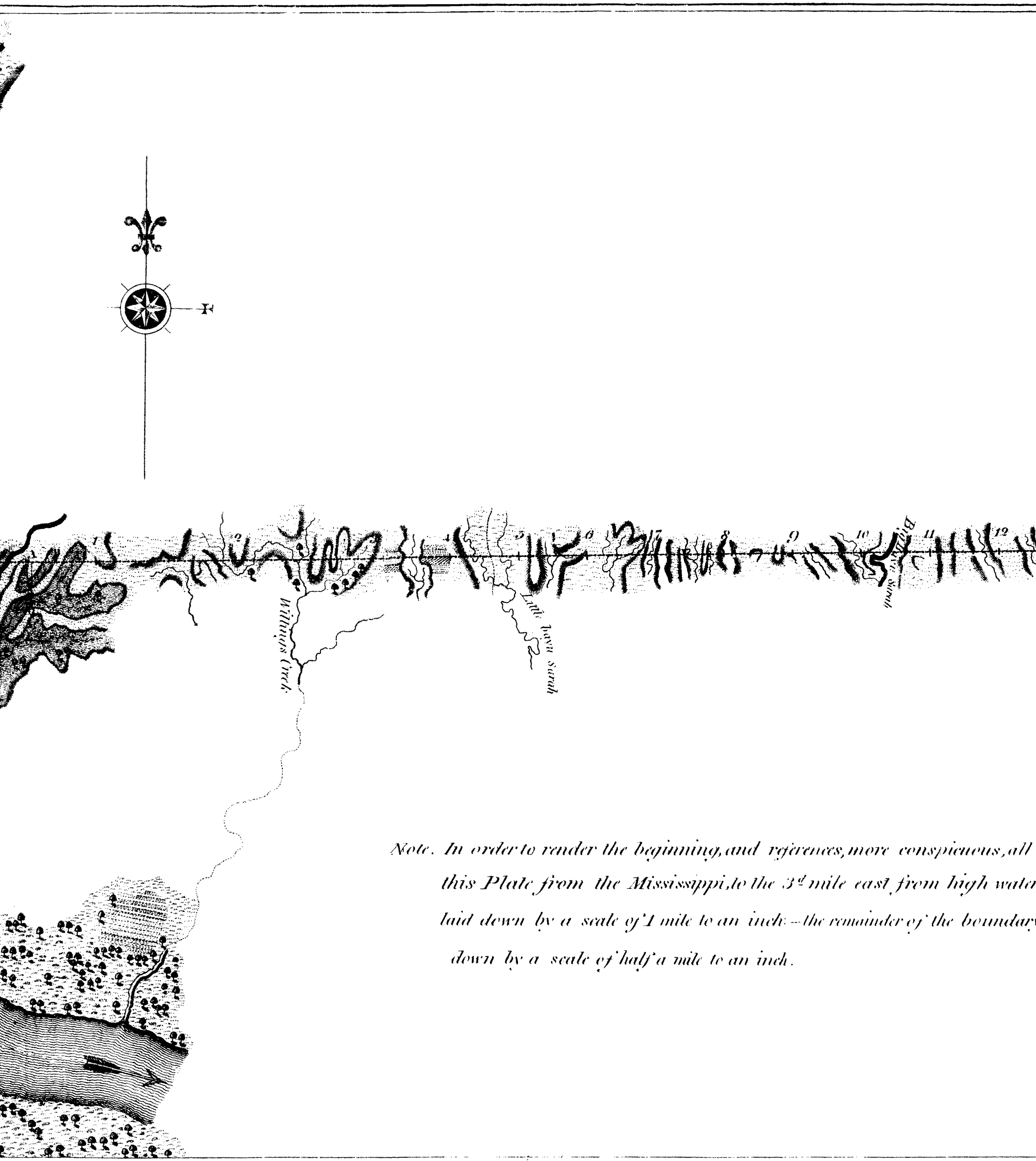
Longitude

* The night preceding this obſervation, the tent in which the clock was placed was blown down and lodged on the clock till morning, when it was removed.



Lawson Sc.

No 2.



Note. In order to render the beginning, and references, more conspicuous, all
this Plate from the Mississippi, to the 3^d mile east from high water
laid down by a scale of 1 mile to an inch: — the remainder of the boundary
down by a scale of half a mile to an inch.

Lawson Sc.

inning, and references, more conspicuous, all the work on
sissippi, to the 3^d mile east from high water mark, is
mile to an inch: — the remainder of the boundary is all laid
mile to an inch.

Longitude deduced from the eclipſes of ♃'s ſatellites obſerved at Thomſon's Creek.

			h	′	″	
Sept. 10th.	*Immerſion* of the 2d ſatellite		6	4	14	Longitude weſt from Greenwich.
	do. . 1ſt do.		6	5	8	
17th.	do. . 2d do.		6	3	58	
	do. . 1ſt do.		6	4	45	
24th.	do. . 2d do.		6	3	50	
	do. . 1ſt do.		6	4	37	
26th.	do. . 1ſt do.		6	4	41	
	do. . 3d do.	by de Lambre's Tables.	6	3	4	
	Emerſion . do. do.	do.	6	6	48	
Oct. 19th.	*Immerſion* . 1ſt do.		6	4	49	
	do. . 2d do.		6	4	52	

At the end of the 21ſt mile in the line, the land became of a more inferior quality, from which we concluded to purſue a leſs ſcientific but a more expeditious method, until the goodneſs of the ſoil would juſtify a greater degree of accuracy: Agreeably to this concluſion, we had a line traced eaſt with a ſurveying compaſs, from the end of the 21ſt mile, from high water mark on the Miſſiſſippi, to the eaſt ſide of Pearl or Half-way river, the diſtance being 85 miles and 194 perches, at the end of which the following obſervations were made.

Nov. 19th. Put up the clock and ſet it to apparent time nearly.

20th. *Equal altitudes of the Sun.*
A. M. $9^h\ 22'\ 40''$. P. M. $2^h\ 37'\ 30''$.

Emerſion of the 1ſt ſatellite of ♃ obſerved at $9^h\ 43'\ 30''$. —Belts diſtinct, magnifying power 120.

21ſt. *Equal altitudes of the Sun.*
A. M. $9^h\ 33'\ 19''$. P. M. $2^h\ 27'\ 6''$.

22d. *Equal altitudes of the Sun.*
A. M. $9^h\ 38'\ 34''$. P. M. $2^h\ 22'\ 9''$.

Obſervations on a Lunar Eclipſe.

At 17^h 10′ the ☽'s limb entered the penumbra, but was not indented till 17^h 11′ 34″.—The earth's ſhadow was not well defined, and the atmoſphere ſmoky.—The ☽ was obſcured by clouds at 17^h 25′.—Magnifying power of the teleſcope about 60.

25th. *Equal altitudes of the Sun.*
A. M. 9^h 34′ 39″. P. M. 2^h 27′ 19″.

28th. *Equal altitudes of the Sun.*
A. M. 9^h 18′ 42″. P. M. 2^h 44′ 55″.

30th. *Equal altitudes of the Sun.*
A. M. 9^h 17′ 11″. P. M. 2^h 44′ 18″.

The ſmall zenith ſector arrived, which we agreed to uſe for the determination of this point in the line.—The large one having been ſent by water by the way of New-Orleans, and we were uncertain when it would come to hand.

Thermometer 84°.

Dec. 1ſt. Poliſhed the reflectors of the eye-piece, of the teleſcope of the ſmall zenith ſector, and ſet it up

With the face to the Weſt.

Cloudy.—Thermometer 60° at ſun riſe, roſe to 83°.

2d. Cloudy.—Thermometer 64° at ſun riſe, roſe to 84°.

3d. *Equal altitudes of the Sun.*

	h	′	″		h	′	″
A. M.	9	34	8.5.	P. M.	2	31	45.5.

Thermo-

Thermometer 54° at ſun riſe, roſe to 70°.

		°	′	″	
Obſerved zenith diſtance	α Lyræ .	7	34	10	N.
do. . .	β Pegaſi .	4	2	22	S.
do. . .	α Andromedæ	3	3	19	S.
do. . .	β Andromedæ	3	30	47	N.
do. . .	β Tauri .	2	36	46	S.
do. . .	Caſtor .	1	16	38	N.
do. . .	Pollux .	2	32	3	S.

4th. *Equal altitudes of the Sun.*
A. M. 9^h 30′ 11″. P. M. 2^h 36′ 26″.

Thermometer 28° at ſun riſe, roſe 50°.

		°	′	″	
Obſerved zenith diſtance of	α Lyræ .	7	34	9	N.
do. . .	β Pegaſi .	4	2	22	S.
do. . .	α Andromedæ	3	3	18	S.
do. . .	β Andromedæ	3	30	45	N.
do. . .	β Tauri .	2	36	37.5	S.
do. . .	Caſtor .	1	16	38	N.
do. . .	Pollux .	2	32	8	S.

Emerſion of the 1ſt ſatellite of ♃ obſerved at 13^h 32′ 35″. —Night clear, belts diſtinct, magnifying power 120.

5th. *Equal altitudes of the Sun.*
A. M. 9^h 40′ 59″. P. M. 2^h 26′ 35″.

Face of the Sector Eaſt.

Thermometer 26° at ſun riſe, roſe to 45° in the afternoon, and to 60° after night.

Obſerved zenith diſtance of α Andromedæ 2° 59′ 0″ S. The ſtar was ſeen but a few times during the obſervation between the clouds as they paſſed.

6th. Cloudy with ſome rain in the morning, and ſo dark that we had to breakfaſt by candle light at 8^h A. M.

7th. Cloudy with ſome rain.—Thermometer 55° at ſun riſe, roſe to 70°.

8th. The clouds blew off a few minutes, when the following obſervation was made.

Obſerved zenith diſtance of α Andromedæ 2° 59′ 6″ s.

Immediately after the above obſervation was made, the hemiſphere was covered with dark clouds, which were attended with rain, ſharp lightning, and heavy thunder till the next morning.

Thermometer 60° at ſun riſe, roſe to 82°.

			°	′	″	
9th.	Obſerved zenith diſtance of	α Lyræ	7	38	0	N.
	do.	β Pegaſi	3	58	16	S.
	do.	α Andromedæ	2	59	8	S.
	do.	β Andromedæ	3	35	11	N.

Cloudy the remainder of the night.

Thermometer 51° at ſun riſe, fell to 31° in the evening.

10th. *Equal altitudes of the Sun.*

A. M. 8h 20′ 21″. P. M. 3h 50′ 33″.

		°	′	″	
Obſerved zenith diſtance of	α Lyræ	7	38	1	N.
do.	β Pegaſi	3	58	19	S.
do.	α Andromedæ	2	59	9	S.
do.	β Tauri	2	32	32	S.

Juſt before the obſervation on α Andromedæ was made, a cloud appeared above the horizon and about 30° ſouth of weſt: From this cloud a number of ſtreamers iſſued ſimilar to an Aurora borealis, but much whiter.—One of them paſſed above the ſouthern horizon, and terminated in the weſt ſhoulder of Orion; another paſſed over Mars and Jupiter, and extended almoſt to the eaſtern horizon; a third paſſed through the northern part of Andromedæ, and a fourth through Urſa Minor.—Theſe ſtreamers in a few

few minutes broke into very minute clouds which moved with great rapidity towards the eaſt, and in leſs than fifteen minutes extended over the whole hemiſphere.—The ſtars appeared and diſappeared almoſt inſtantly; I ſuppoſe that α Andromedæ not leſs than thirty times during the obſervation; β Andromedæ was likewiſe ſeen, but it appeared and diſappeared too rapidly to be obſerved with any degree of certainty. β Tauri was ſeen almoſt as frequently as β Andromedæ, but the obſervation nevertheleſs appeared to be correct. Before Caſtor and Pollux came to the meridian, the clouds became heavy and dark, and obſcured all the ſtars for the remainder of the night. This phenomenon was not attended with any wind.

Thermometer 31° at ſun riſe, roſe to 45°.

11th. *Equal altitudes of the Sun.*

	h	′	″		h	′	″
A. M.	8	37	12.5.	P. M.	3	34	22.

		°	′	″	
Obſerved zenith diſtance of	α Lyræ .	7	38	1	N.
do. . .	β Pegaſi .	3	58	18	S.
do. . .	α Andromedæ	2	59	2	S.
do. . .	β Andromedæ	3	35	7	N.
do. . .	β Tauri .	2	32	28	S.
do. . .	Caſtor .	1	20	59	N.
do. . .	Pollux .	2	27	58	S.

Emerſion of the 1ſt ſatellite of ♃ obſerved at $15^h\ 26'\ 34''$.—The planet was low and tremulous, the belts middling diſtinct, magnifying power of the teleſcope 120.

Thermometer during the three laſt obſervations at 21°.

12th. Cloudy all day.

13th. Cloudy till evening.

Obſerved

		°	′	″	
Obſerved zenith diſtance of	β Pegaſi .	3	58	13	S.
do. . .	β Andromedæ	3	35	4	N.
do. . .	β Tauri .	2	32	34	S.
do. . . .	Caſtor .	1	21	4	N.
do. . .	Pollux .	2	27	58	S.

Emerſion of the 1ſt ſatellite of ♃ obſerved at $9^h\ 54'\ 2''$. The night clear, belts very diſtinct, magnifying power 120.

Thermometer 22° at ſun riſe, roſe to 57°.

14th. *Immerſion* of the 3d ſatellite of ♃ obſerved at $7^h\ 44'\ 6''$. —The belts very diſtinct, and the ſatellites remarkably bright, magnifying power 120.

Thermometer 31° at ſun riſe, roſe to 61°.

15th. *Equal altitudes of the Sun.*

A. M. $8^h\ 20'\ 34''$. P. M. $3^h\ 52'\ 42''$.

Emerſion of the 2d ſatellite of ♃ obſerved at $12^h\ 50'\ 19''$. —Belts diſtinct, magnifying power 120.

End of the obſervations made at Pearl river.

Rate of the clock's going deduced from the equal altitudes of the Sun

			′	″	″	
Clock too faſt mean time	Nov.	20th.	14	8.6	8.5	daily loſs.
do.		21ſt.	14	0.1	8.2	do.
do.		22d.	13	51.9	5.2	do.
do.		25th.	13	36.3	4.0	do.
do.		28th.	13	24.3	9.1	do.
do.		30th.	13	6	9.7	do.
do.	Dec.	3d.	12	37.1	3.5	do.
do.		4th.	12	33.6	2.9	daily gain.
do.		5th.*	12	36.5	7.1	daily loſs.
do.		10th.	12	1	8.4	do.
do.		11th.	11	52.7	16.4	do.
do.		15th.	10	47.1		

Reſult

* Till this time the clock was left expoſed, and people frequently leaning againſt the poſt to which it was faſtened, and the poſt ſtanding in ſand, no better place to be had.

Refult of the obfervations for the longitude.

Nov. 20th.	*Emerfion* of the 1ft fatellite of ♃	6	0	24	Weft from Greenwich.
Dec. 4th.	. do. . . .	5	58	58	
11th.	. do. . . .	5	59	8	
13th.	. do. . . .	5	59	53	
14th.	*Immerfion* of the 3d do. by de Lambre's Tables.	5	59	43	
15th.	*Emerfion* of the 2d do. .	5	59	5	
	By the lunar eclipfe November 22d.				
	If the ☽'s firft touching the penumbra be confidered as the beginning, the longitude will be	5	59	38	
	If the ☽'s being indented be taken for the beginning, the longitude will be	6	1	12	

Refult

Result of the observations for the latitude.

The foregoing observed Zenith Distances when arranged stand as below.

Face of the Sector West.

	α Lyræ.	β Pegasi.	α Andromedæ.	β Andromedæ.	β Tauri.	Castor.	Pollux.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
December 3d.	7 34 10 N.	4 2 22 S.	3 3 19 S.	3 30 47 N.	2 36 46 S.	1 16 38 N.	2 32 3 S.
4th.	7 34 9	4 2 22	3 3 18	3 30 45	2 36 37.5	1 16 38	2 32 8
Means . .	7 34 9.5	4 2 22	3 3 18.5	3 30 46	2 36 41.7	1 16 38	2 32 5.5
Face of the Sector East.							
5th.	. . . .	. . . .	2 59 0	. . . .	. . . . . .	. . . . . .	. . . . . .
8th.	. . . .	. . . .	2 59 6	. . . .	. . . . . .	. . . . . .	. . . . . .
9th.	7 38 0	3 58 16	2 59 8	3 35 11	. . . . . .	. . . . . .	. . . . . .
10th.	7 38 1	3 58 19	2 59 9	. . . .	2 32 32	. . . . . .	. . . . . .
11th.	7 38 1	3 58 18	2 59 2	3 35 7	2 32 28	1 20 59	2 27 58
13th.	. . . .	3 58 13	. . . .	3 35 4	2 32 34	1 21 4	2 27 58
Means . .	7 38 0.7	3 58 16.5	2 59 5	3 35 7	2 32 31	1 21 1.5	2 27 58
Means face west . . .	7 34 9.5	4 2 22	3 3 18.5	3 30 46	2 36 41.7	1 16 38	2 32 5.5
True observed zenith distances	7 36 5.1	4 0 19.2	3 1 11.7	3 32 56.5	2 34 36.3	1 18 49.7	2 30 1.7
Refractions . . .	+ 7.5	+ 4	+ 3	+ 3.5	+ 2.5	+ 1.2	+ 2.5
Correct zenith distances	7 36 12.6	4 0 23.2	3 1 14.7	3 33 0	2 34 38.8	1 18 50.9	2 30 4.2
Mean declinations to the 9th .	38 36 11.1 N.	26 59 32.9 N.	27 58 41.6 N.	34 33 4.0 N.	28 25 19.4 N.	32 18 46.5 N.	28 29 57.4 N.
Aberrations	+ 5.7	+ 10.6	+ 10.7	+ 11.5	+ 1.5	— 4.0	— 3.8
Nutations	— 6.4	— 7.0	— 5.7	— 4	+ 4.5	+ 7.3	+ 7.5
True declinations . . .	38 36 10.4	26 59 36.5	27 58 46.6	34 33 11.5	28 25 25.4	32 18 49.8	28 30 1.1
Correct zenith distances . . .	−7 36 12.6	+4 0 23.2	+3 1 14.7	−3 33 0	+2 34 38.8	−1 18 50.9	+2 30 4.2
Latitudes	30 59 57.8 N.	30 59 59.7 N.	31 0 1.3 N.	31 0 11.5 N.	31 0 4.2 N.	30 59 58.9 N.	31 0 5.2 N.

Latitude

			°	′	″
Latitude by	α Lyræ	. .	30	59	57.8
do.	β Pegafi	. .	30	59	59.7
do.	α Andromedæ	.	31	0	1.3
do.	β Andromedæ	.	31	0	11.5
do.	β Tauri	. .	31	0	4.2
do.	Caftor	.	30	59	58.9
do.	Pollux	.	31	0	5.2
Mean latitude North		. .	31	0	2.7

From the above refult for the latitude, it appears that the obfervatory was too far north by 2″.7 or about 272 feet, and the guide or compafs line being 68.8 feet fouth of the obfervatory, it appears that the guide or compafs line oppofite to the obfervatory was too far north by 213.2 feet. This correction of 213 2 feet was carefully laid off to the fouth, and the guide, or compafs line corrected back to the 21ft mile, by laying off to the fouth from the end of each mile a proportional part of the 213.2 feet —For a chart of this part of the boundary fee Plate VII.* From the termination of the 213.2 feet, another guide or compafs line was carried eaft 99 miles, and 194 perches, to the weftern bank of the Mobile, or Tombecby river, where the following obfervations were made.

1799.

March 18th. Put up the clock and fet it to apparent time nearly.

Set up the large Sector with the Face to the Eaft.

19th. Cloudy with heavy rain at night.

20th. Flying clouds great part of the day, heavy rain in the afternoon, and evening, attended with fharp lightning, and remarkably loud thunder.

21ft. Cloudy all day with a little rain and ftrong north wind, cleared off about midnight with a violent wind from the N. W.

Obferved zenith diftance of α Coro. Borealis 3° 36′ 55″ s.

The above obfervation is doubtful owing to the violence of the wind which affected the plumb-line.

* The offsets were too fmall to be laid down on the chart.

22d. *Equal altitudes of the Sun.*
A. M. 8h 56′ 16″. P. M. 3h 3′ 13″.

Observed zenith distance of	β Tauri .	2° 35′ 0″.5	S.
do. . .	α Coro. Borealis	3 36 53	S.

Thermometer 40° at sun rise, rose to 51°.

23d. *Equal altitudes of the Sun.*
A. M. 8h 44′ 36″. P. M. 3h 13′ 23″.

		° ′ ″	
Observed zenith distance	β Tauri .	2 34 59.5	S.
do. . .	Castor .	1 18 26.7	N.
do. . .	Pollux .	2 30 29	S.
do. .	α Coro. Borealis	3 36 55	S.

Set up the transit and equal altitude instrument, and took the greatest elongation of α Ursæ Minor. West.

Thermometer 39° at sun rise, rose to 67° in the afternoon.

24th. *Equal altitudes of the Sun.*
A. M. 9h 29′ 0″ P. M. 2h 28′ 2″

Took the greatest elongation of α Ursæ Minor. West, which did not differ perceptibly from the observation of yesterday.

Observed zenith distance of	Castor	1° 18′ 28″.8	N.
do. . .	Pollux	2 30 30	S.

Took the greatest elongation of α Ursæ Minor. East.

The observations on α Ursæ Minor. were made for the purpose of tracing a meridian, a particular account of which will close the work done at this station.

Thermometer 39° at sun rise, rose to 59°.

25th. *Equal altitudes of the Sun.*
A. M. 9h 0′ 21″. P. M. 2h 55′ 49″.

Observed zenith distance of β Tauri 2° 34′ 57″.5 S.

Took

Took the greatest elongation of α Ursæ Minor. West.

Observed zenith distance of	Castor	1° 18′ 27″.5 N.
do. . .	Pollux	2 30 26 S.

Took the greatest elongation of α Ursæ Minor. East.

Thermometer 40° at sun rise.

26th. Set the clock two minutes forward, and raised the pendulum bob.

Turned the face of the Sector West.

Equal altitudes of the Sun.

A. M. 9h 3′ 52″. P. M. 2h 55′ 26″.5.

Traced a meridian by bisecting the angle, formed by the greatest elongations of α Ursæ Minor. East, and West.

	° ′ ″	
☉'s preceding limb on the meridian at	11 58 26*	A. M.
Subsequent do. . . .	0 0 34	P. M.
Centre at	11 59 30	A. M.

	h ′ ″
Sirius passed the first fibre of the transit instrument at .	6 11 41
The meridian at .	6 12 29
The third fibre at .	6 13 24

27th.

	h ′ ″	
☉'s preceding limb on the meridian at	11 58 15	A. M.
Subsequent do. . .	12 0 23	P. M.
Centre at	11 59 19	A. M.

Observed zenith distance of β Tauri 2° 36′ 38″.5 S.

* The Sun's passage over the meridian when it occurs, is entered according to the civil account.

		h	'	"	
Sirius passed the first fibre of the transit instrument at	.	6	7	52	
The meridian at	.	6	8	41	
The third fibre at	.	6	9	36	

		h	'	"	
Observed zenith distance of	Castor .	1	16	47.4	N.
do. .	Pollux .	2	32	3	S.
do. .	α Coro. Borealis	3	38	25	S.

Thermometer 41° in the morning, raised to 67°.

		h	'	"	
28th.	☉'s preceding limb on the meridian at	11	58	5.5	A. M.
	Subsequent do. . .	12	0	14	P. M.
	Centre	11	59	9.7	A. M.

		h	'	"
Sirius passed the first fibre of the transit instrument at	.	6	4	6
The meridian at	.	6	4	55
The third fibre at	.	6	5	51

Observed zenith distance of	Castor	1°	16′	48″.6	N.
do. . .	Pollux	2	32	5	S.

Thermometer 49° at sun rise.

		h	'	"	
29th.	☉'s preceding limb on the meridian at	11	57	59	A. M.
	Subsequent do. . . .	12	0	7	P. M.
	Centre do. . . .	11	59	3	A. M.

Observed zenith distance of	Castor	1°	16′	50″.5
do. . .	Pollux	2	32	3

Thermometer 51° at sun rise, rose to 73°.

30th. Cloudy with rain.

		h	'	"	
31st.	☉'s preceding limb on the meridian at	11	57	41	A. M.
	Subsequent do. . . .	11	59	50	A. M.
	Centre do. . . .	11	58	45.5	A. M.

Observed

Obferved zenith diftance of β Tauri 2° 36′ 37″.7

		h	′	″	
Sirius paffed the firft fibre of the tranfit inftrument at	.	5	52	50	
The meridian at	.	5	53	39	
The third fibre at	.	5	54	34	

			°	′	″	
Obferved zenith diftance of	Caftor	.	1	16	50	N.
do. .	Pollux	.	2	32	1	S.
do. .	α Coro. Borealis		3	38	25.7	S.

Thermometer 84° at 4 o'clock P. M.

		h	′	″	
April 1ft.	☉'s preceding limb on the meridian at	11	57	31	A. M.
	Subfequent do.	11	59	40	A. M.
	Centre do.	11	58	35.5	A. M.

Cloudy in the afternoon attended with fharp lightning, heavy thunder, and a great fall of rain.

			h	′	″
2d.	Sirius paffed the firft fibre of the tranfit inftrument at	.	5	45	19
	The meridian at	.	5	46	8
	The third fibre at	.	5	47	2

Obferved zenith diftance of α Coro. Borealis 3° 38′ 27″.5 S.

		h	′	″	
3d.	☉'s preceding limb on the meridian at	11	57	15	A. M.
	Subfequent do.	11	59	24	A. M.
	Centre do.	11	58	19	A. M.

♀ paffed the meridian at . 1^h 24′ 32″ centrum.

Obferved zenith diftance of β Tauri 2° 36′ 38″.7 S.

		h	′	″
Sirius paffed the firft fibre of the tranfit inftrument at	.	5	41	33
The meridian at	.	5	42	22
The third fibre at	.	5	43	17

4th.

		h	′	″	
4th.	☉'s preceding limb on the meridian at	11	57	9	A. M.
	Subſequent do. . . .	11	59	18	A. M.
	Centre do. . . .	11	58	13.5	A. M.

5th. Cloudy all day.

		h	′	″	
6th.	☉'s ſubſequent limb on the meridian at	11	59	10	A. M.
	Deduct the paſſage of the ſemi diameter —		1	4.5	
	Centre on the meridian at .	11	58	5.5	A. M.

♀ paſſed the meridian at . $1^h\ 27'\ 30''$ Centrum.

	h	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument at .	5	30	22
The meridian at .	5	31	11
The third fibre at .	5	32	6

		h	′	″	
7th.	☉'s preceding limb on the meridian at	11	56	55	A. M.
	Subſequent do. . .	11	59	5	A. M.
	Centre . do. . .	11	58	0	A. M.

	h	′	″
Sirius on the firſt fibre of the tranſit inſtrument at	5	26	39
The meridian at .	5	27	27
The third fibre at .	5	28	23

8th. Cloudy with a little rain in the evening. Thermometer 39° in the morning.

Obſerved

Obſerved the times, and diſtances, of the neareſt limbs of the ☉ and ☽ as below.

	h	′	″	°	′	″	
	22	51	25	48	2	0	
	22	52	27	48	2	20	
	22	53	27	48	2	40	Add 7″ for the error of the Sextant.
	22	54	12	48	3	0	
	22	54	55	48	3	20	
	22	55	43	48	4	0	
Means	22	53	41	48	2	53	

Taken again as follows.

	h	′	″	°	′	″	
	23	34	21	48	18	10	
	23	35	48	48	18	40	
	23	37	1	48	19	20	Add 7″ for the error of the Sextant.
	23	37	49	48	19	40	
	23	38	30	48	20	10	
	23	39	15	48	20	20	
Means	23	37	7	48	19	23	

9th. ☉'s preceding limb on the meridian at 11^h 56′ 47″ A. M.
Subſequent . do. . 11 58 56 A. M.

Centre at . . 11 57 51.5 A. M.

♀ paſſed the meridian at . 1^h 30′ 38″ Centrum.

Equal altitudes of the Sun.
A. M. 8^h 47′ 50″. P. M. 3^h 8′ 9″.

	h	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument .	5	19	12
The meridian at	5	20	1
The third fibre at	5	20	56

10th.

10th. Took down and packed up the inſtruments.

During my employ on the boundary I made it a point to multiply my aſtronomical obſervations as much as poſſible when it did not interfere with my other buſineſs: in this I had two views; *firſt*, becauſe obſervations accurately made never become obſolete, and may at ſome future day be found eſſentially uſeful, and *ſecondly*, to determine by experiment, what reliance might be placed in obſervations made at temporary ſtations, without any of the conveniences annexed to permanent obſervatories.—The meridian being traced upon accurate principles, furniſhed an opportunity of comparing equal altitudes of the ſun, with the tranſits of his centre over the meridian. The foregoing obſervations made at this ſtation, furniſh the two following compariſons.

On the 26th of March the ☉'s centre paſſed the meridian at } $11^h\ 59'\ 30''$ A. M.

Equal altitudes of the ☉ on that day.

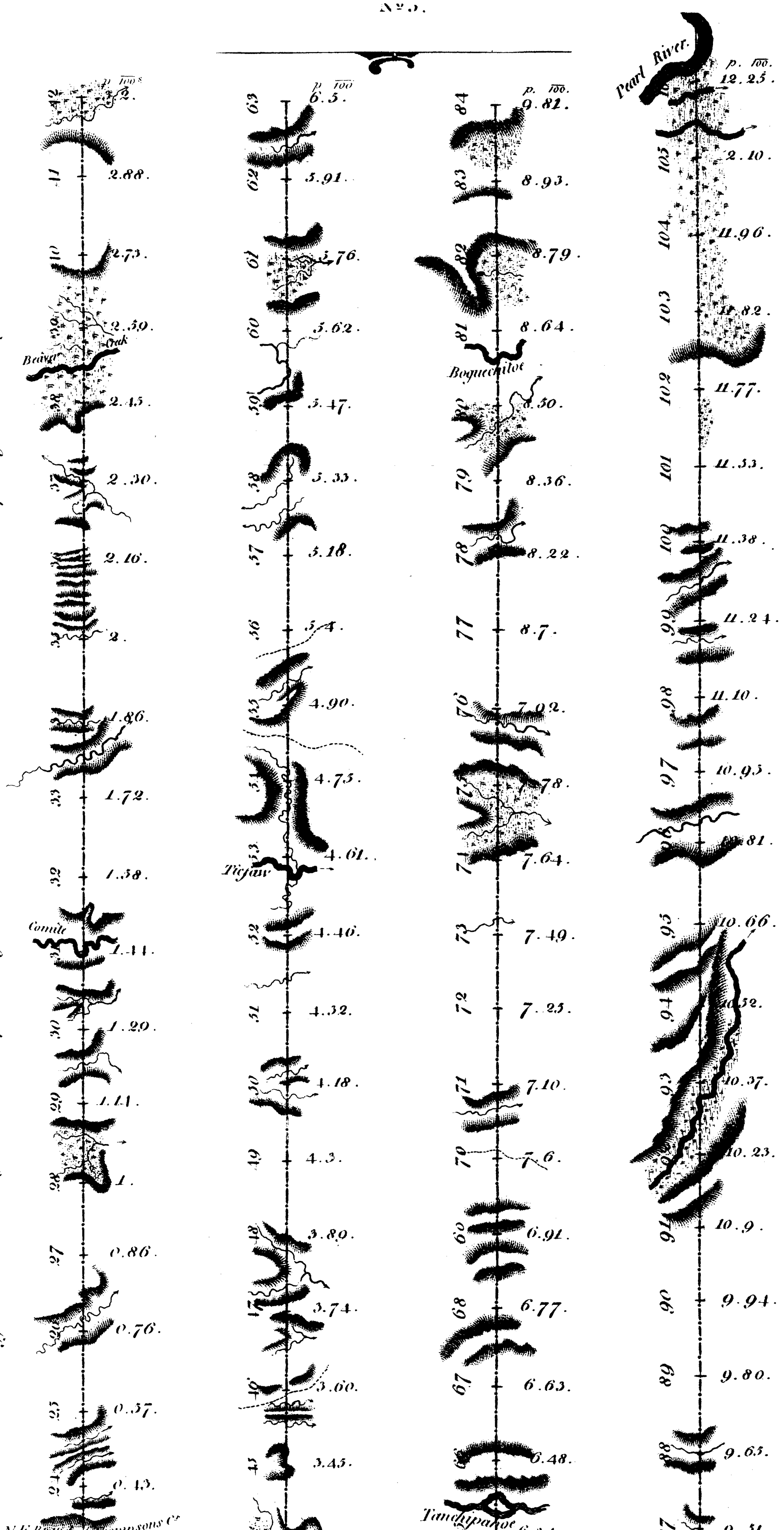
		h ′ ″		h ′ ″
	A. M.	9 3 52.	P. M.	2 55 26.5
Add				12
				14 55 26.5
Deduct forenoon's obſervation				9 3 52
				2)5 51 34.5
Half				2 55 47.2
Add forenoon's obſervation				9 3 52
				11 59 39.2
Deduct for change of ☉'s declination . .				— 9.6
☉'s centre paſſed the meridian by equal altitudes				11 59 29.6

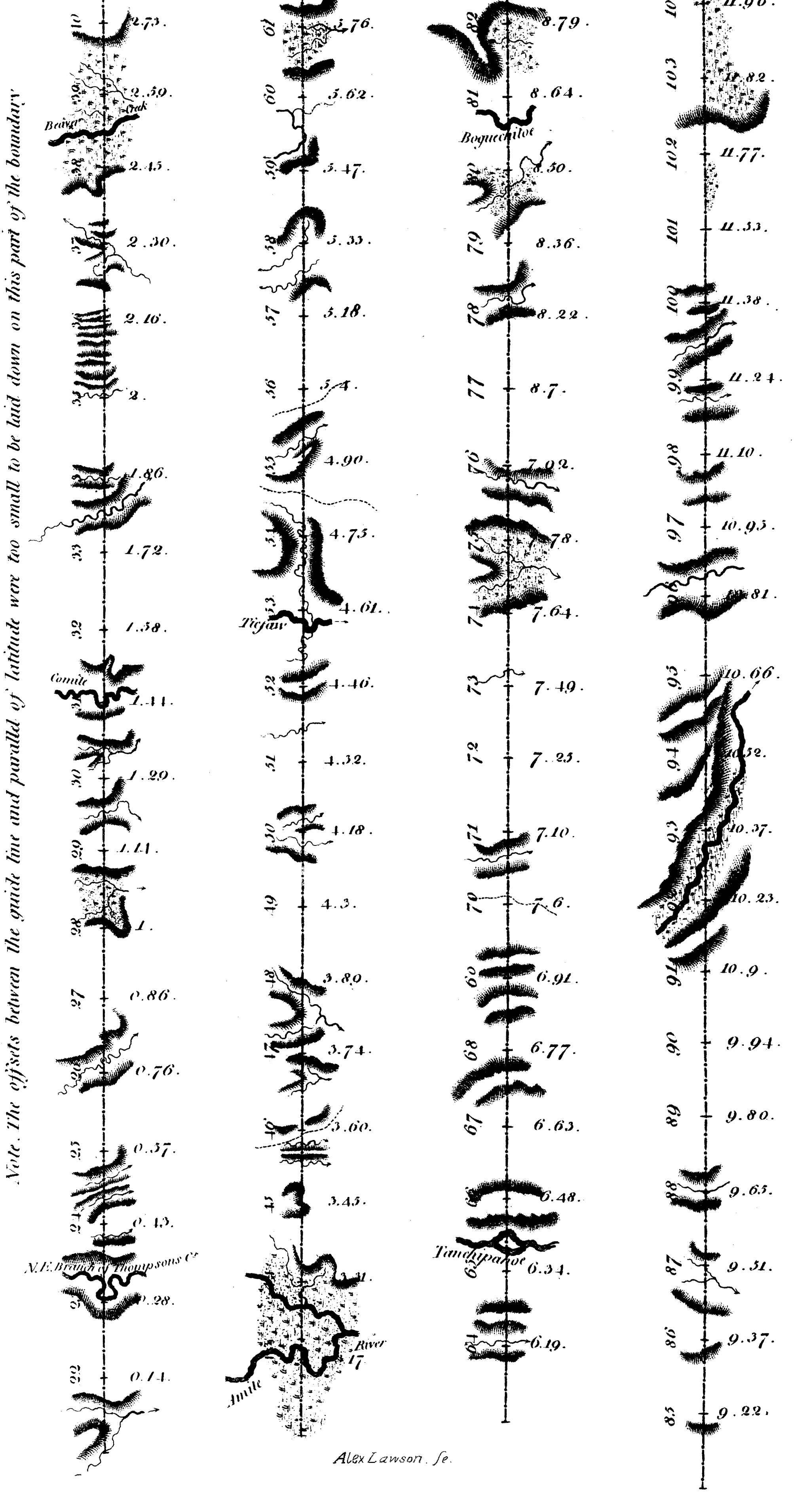
Which differs but $\frac{4}{10}$ths of a ſecond from his paſſage over the meridian by obſervation.

On the 9th of April the ☉'s centre paſſed the meridian at } $11^h\ 57'\ 51''.5$ A. M.

Equal

Note. The offsets between the guide line and parallel of latitude were too small to be laid down on this part of the boundary





Alex Lawson. Sc.

Equal altitudes of the Sun on that day.

	h ′ ″		h	′	″
	A. M. 8 47 50.	P. M.	3	8	9
Add			12		
			15	8	9
Deduct forenoon's obfervation			8	47	50
		2)	6	20	19
Half			3	10	9.5
Add the forenoon's obfervation . . .			8	47	50
			11	57	59.5
Deduct for change of the ☉'s declination .				—	8.6
☉'s centre paffed the meridian by equal altitudes at			11	57	50.9

Which differs from the obferved time but $\frac{6}{10}$ths of a fecond.

The paffage of the ftars over the meridian afford an eafy, and accurate method of determining the rate of the going of a clock, as is well known to all aftronomers; and when the right afcenfion of a ftar is well fettled, the error of a clock can be determined by it with great precifion,—as for example, take the paffage of Sirius on the 27th of March.

	h	′	″
Right afcenfion of Sirius the beginning of 1800 according to De Zach*	6	36	19.9
Deduct ann. preceffion for one year		—	2.6
Right afcenfion the beginning of 1799	6	36	17.3
Aberration and preceffion on the 27th of March .		+	0.6
Nutation . do.		—	0.7
True right afcenfion of Sirius	6	36	17.2
☉'s right afcenfion by the Nautical Almanac at the time Sirius paffed the meridian, deduct	0	26	53.5
Sirius paffed the meridian apparent time at . . .	6	9	23.7
Do. . . by obfervation	6	8	41
Clock too flow apparent time	0	0	42.7

* Vide Obfervationibus Aftronomicis Annis 1787, 1788, 1789, 1790.

	h	′	″
☉'s centre paſſed the meridian on the 27th of March at	11	59	19 A. M.
Equation of time + 5′ 20″.8	12	5	20.8
Clock too ſlow mean time	0	6	1.8
By the paſſage of Sirius over the meridian on the 27th and 28th the clock gained on mean ſolar time, about 10″ per diem, which is equal to about 2″.5 when Sirius was obſerved, which is to be deducted		—	2.5
Clock too ſlow mean time when Sirius paſſed the meridian	0	5	59.3
Equation of time . . do. . . .	0	5	16.1
Clock too ſlow apparent time, which differs but ½ a ſecond from the error given by Sirius	0	0	43.2

The neareſt diſtances of the limbs of the ☉, and ☽, were taken twice at this ſtation, (as entered in the journal), and may ſerve as examples of the accuracy of that method of determining the longitude.—As their altitudes were not taken at the time of the obſervations, they were determined by calculation: The latitude and time being known from obſervation, and the declinations deduced from the Nautical Almanac upon a ſuppoſition that the longitude was about 5 hours, and 52 minutes, weſt from Greenwich.—The method of calculating an altitude; the latitude, time, and declination being given, may be found in moſt books of ſpherical trigonometry, and a very eaſy one, particularly adapted to this purpoſe, in the requiſite tables problems 5, 6 and 7; but to prevent any errors which might ariſe from this ſource, and affect the determination of the longitude, I would recommend that the altitudes be determined both ways, as checks upon each other.—Either of the methods bring out the true altitude of the ☉'s, or ☽'s centre; but as the apparent is generally wanted, it will be had by ſubſtracting the parallax in altitude, and adding the refraction.

	h	′	″
The firſt obſervation was made by the clock April 8th at .	22	53	41
Clock too ſlow apparent time		2	6
The apparent time of the obſervation was therefore at .	22	55	47

	°	′	″
Obſerved diſtance of the limbs . .	48	2	53
☉'s ſemi-diameter	+	16	0
☽'s do.	+	14	59
Error of the Sextant	+	0	7
☽'s increaſed ſemi-diameter for her altitude	+	0	8
Obſerved diſtance of the centres . .	48	34	7

☉'s true

	° ′ ″			
⊙'s true altitude	62 19 20			
☽'s do.	33 55 58			
Difference true altitudes	28 23 22			
⊙'s apparent altitude	62 19 48			
☽'s do.	33 11 25			
Difference apparent altitudes	29 8 23			
Observed distance of the centres	48 34 7			
Sum	77 42 30			
Difference	19 25 44			
½ Sum	38 51 15		S	9.7975032
½ Difference	9 42 52		S	9.2272126
☽'s apparent altitude	33 11 25	co. ar.	c. S	0.0773486
☽'s true altitude	33 55 58		c. S	9.9189175
⊙'s apparent altitude	62 19 48	co. ar.	c. S	0.3331280
⊙'s true altitude	62 19 20		c. S	9.6669844
				2)39.0210943
Difference true altitudes	28 23 22			
				19.5105471
½ Difference	14 11 41		S	9.3895525
Tangent				10.1209946
Corresponding c. S	(To be deducted from the 2d line above increased by 10.)			9.7806675
	23 58 29.5 / 2		S	9.6088850
True distance	47 56 59			
Dist. at Greenwich 9d 3h	47 6 51			
Do. 9 6	48 30 30			
Difference between 1st and 2d	0 50 8	P. L. 5551		
Do. between 2d and 3d	1 23 39	P. L. 3328		h ′ ″
		2223	=	1 47 46
Add				9d 3 0 0
Time at Greenwich				9 4 47 46
Time of the observation on the Mobile				8 22 55 47
Longitude west from Greenwich				0 5 51 59

The

	h	′	″
The fecond obfervation was made April 8th by the clock at	23	37	7
Clock too flow apparent time		2	7
The apparent time of the obfervation was therefore at .	23	39	14

	°	′	″
Obferved diftance of the limbs	48	19	23
☉'s femi-diameter	+	16	0
☽'s femi-diameter	+	14	59
Error of the Sextant	+	0	7
☽'s increafed femi-diameter from her altitude	+	0	10
Obferved diftance of the centres	48	50	39

	°	′	″			
☉'s true altitude	66	6	20			
☽'s do.	42	54	46			
Difference true altitudes . .	23	21	34			
☉'s apparent altitude	66	16	42			
☽'s . do.	42	15	7			
Difference apparent altitudes . .	24	1	35			
Obferved diftance of the centres .	48	50	39			
Sum	72	52	14			
Difference	24	49	4			
½ Sum	36	26	7	. .	S	9.7737238
½ Difference	12	24	32	.	S	9.3322098
☽'s apparent altitude	42	15	7	co. ar.	c. S	0.1306537
☽'s true altitude	42	54	46	.	c. S	9.8647430
☉'s apparent altitude	66	16	42	co. ar.	c. S	0.3954564
☉'s true altitude	66	16	20	.	c. S	9.6046490
						2)39.1014357
Difference true altitudes	23	21	34			
						19.5507178
½ Difference	11	40	47	. .	S	9.3062979
				Tangent .		10.2444199
Correfponding log. cofine	(To be deducted from the 2d line above increafed by 10.)					9.6945605
	24	8	34.5	.	S	9.6117374
			2			
True diftance	48	17	9			
Diftance at Greenwich 9^d 3^h .	47	6	51			
do. . . 9 6 .	48	30	30			

Difference

			h	′	″
Difference between 1ſt and 2d .	1 10 18 P. L. 4083				
do. 2d and 3d .	1 23 39 P. L. 3328				
	755 =		2	31	16
Add		9^d	3		
Time at Greenwich		9	5	31	16
Time of the obſervation on Mobile		8	23	39	14
Longitude weſt from Greenwich		0	5	52	2
do. by the firſt obſervation		0	5	51	59
Mean		0	5	52	0.5

	h	′	″	
The longitude of our camp on Thompſon's creek by the mean of five immerſions of ♃'s firſt ſatellite was	6	4	48	Weſt from Greenwich.
The diſtance from Thomſon's creek on the parallel of 31°, to the obſervatory on the Mobile was by meaſurement 184.46 miles eaſt, which in time is equal to	—0	12	17	
Longitude of the camp on the Mobile .	5	52	31	
do. by the two lunar obſervations .	5	52	0.5	
Difference	0	0	30.5	

Reſult

Refult of the Obfervations made on the Mobile river for afcertaining the Latitude.

The Zenith Diftances ftand as below.

Face of the Sector Eaft.

	β Tauri. ° ′ ″	Caftor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″
March 21ft.	....	....	....	3 36 55 S.
22d.	2 35 0.5 S.	....	....	3 36 53
23d.	2 34 59.5	1 18 26.7 N.	2 30 29 S.	3 36 55
24th.	....	1 18 28.8	2 30 30	....
25th.	2 34 57.5	1 18 27.5	2 30 26	....
Means	2 34 59.2	1 18 27.5	2 30 28	3 36 54.3

Face of the Sector Weft.

	β Tauri. ° ′ ″	Caftor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″
27th.	2 36 38.5	1 16 47.4	2 32 3	3 38 25
28th.	....	1 16 48.6	2 32 5	....
29th.	....	1 16 50.5	2 32 3	....
31ft.	2 36 37.7	1 16 50	2 32 1	3 38 25
April 2d.	....	....	....	3 38 27.5
3d.	2 36 38.7	....	....	....
Means	2 36 38.3	1 16 49.1	2 32 3	3 38 26.1
Means with the face eaft	2 34 59.2	1 18 27.5	2 30 28	3 36 54.3
Means	2 35 48.7	1 17 38.3	2 31 15.5	3 37 40.2
Refractions	+ 2.5	+ 1.3	+ 2.5	+ 3.6
Correct zenith diftances	2 35 51.2	1 17 39.6	2 31 18	3 37 43.8
Mean declinations to the 26th March	28 25 28.6 N.	32 18 48.3 N.	28 29 54.6 N.	27 23 57.6 N.
Aberrations	+ 1.3	+ 2.8	+ 1.3	— 13.3
Nutations	+ 5	+ 7.5	+ 7.9	— 1.6
Semi. ann. equations	+ 0.4	+ 0.5	+ 0.5	+ 0.3
True declinations	28 25 35.3	32 18 59.1	28 30 4.8	27 23 42.4
Correct zenith diftances applied	+2 35 51.2	−1 17 39.6	+2 31 18	+3 37 43.8
Latitudes	31 1 26.5 N.	31 1 19.5 N.	31 1 22.8 N.	31 1 26 2 N.

Latitude

Nº 4

	°	′	″
Latitude by β Tauri . .	31	1	26.5
do. by Caſtor . .	31	1	19.5
do. . Pollux . .	31	1	22.8
do. by α Coro. Borealis .	31	1	26.2
Mean Latitude north . .	31	1	23.7

From the reſult of the above obſervations, the compaſs line was too far north by 1′ 23″.7, or 518.55 perches, which diſtance was carefully laid off to the ſouth, and a ſtone ſet up at the termination, marked on the north ſide U. S. Lat. 31° 1799,—and on the ſouth ſide DOMINOS de S. M. C. CAROLUS IV. Lat. 31° 1799.—From this ſtone, the line was corrected back as in the foregoing caſe, agreeably to plate VIII.

On our arrival at the end of the compaſs line on the Mobile river, one ſerious difficulty preſented itſelf, that was the continuation of the line through the ſwamp, which is at all times almoſt impenetrable; but at that ſeaſon of the year abſolutely ſo: being wholly inundated:—But fortunately we found in the neighbourhood of our camp a ſmall hill, the ſummit of which was juſt elevated above the tops of the trees in the ſwamp. From the top of this hill, we could plainly diſcover the pine trees on the high land, on the eaſt ſide. Upon aſcertaining this fact, we ſent a party through to the other ſide, (along the water courſes, by which the ſwamp is interſected in various directions), with orders to make a large fire in the night with light-wood; the ſame was likewiſe to be done on the hill before mentioned, to obtain nearly the direction from one place to the other.—The atmoſphere was too much filled with ſmoke, to diſcern a flag, or other ſignal,—the woods being on fire on both ſides of the ſwamp.—It happened unfortunately that the day before our fires were to be lighted, the fires in the woods had extended over almoſt the whole of the highlands, on both ſides of the ſwamp; by which ſo many dead trees were ſet on fire, that there was no poſſibility of diſcriminating between them, and our fires.—It was then agreed that the parties ſhould light up, and extinguiſh their fires a certain number of times; making ſtated intervals.—This ſucceeded ſo well, that we became certain of not taking a wrong fire in determining the angles.—Contrary to our expectation, a heavy rain fell on the ſame night, a ſhort time after we had finiſhed the experiment, and extinguiſhed all the fires in the woods.—The ſtorm cleared off with a ſtrong north-weſt wind, which carried off all the ſmoke, and enabled us to determine the angles in the day, by erecting ſignals, which was accompliſhed on the ſecond day of April.—This work was connected with the obſervatory in the following manner. At the obſervatory A (ſee Fig. G, plate IX.) a meridional line was traced, by taking the greateſt elongations of α Urſæ Minoris, both eaſt, and weſt, with the tranſit and equal altitude inſtrument:—equal diſtances were carefully meaſured in each direction, and a fine mark placed at the termination of each meaſurement,—the diſtance between thoſe marks was accurately biſected, and a fine mark placed at the point of biſection for the meridian.

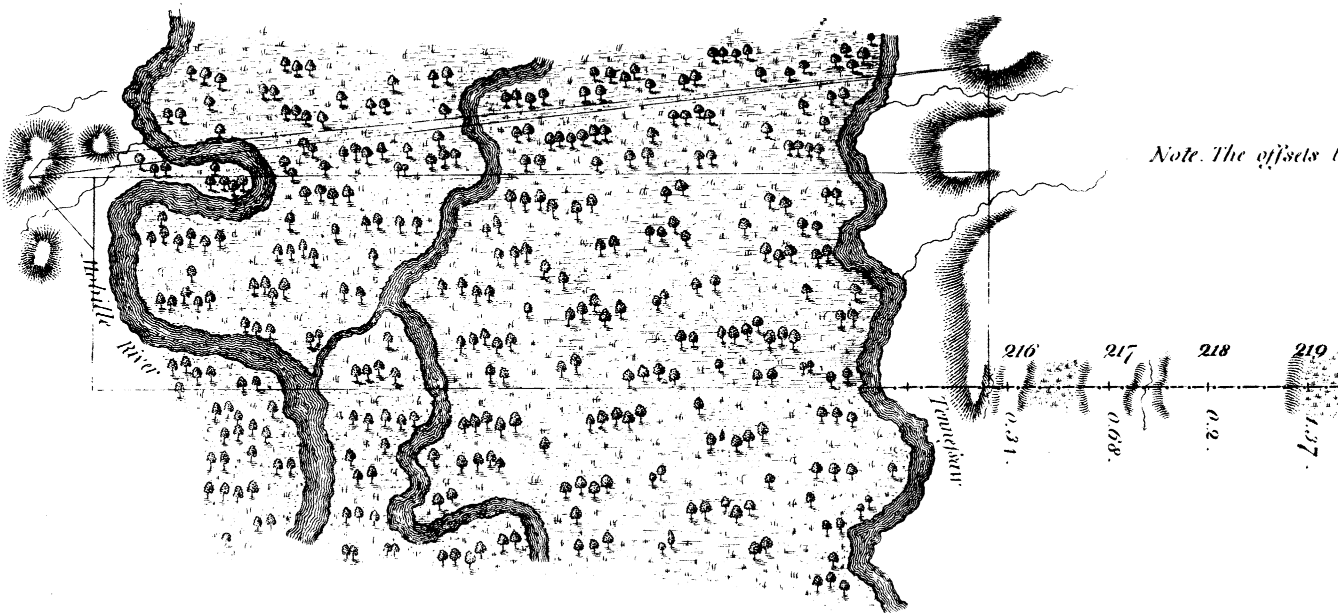
meridian. The ſame operation was performed a ſecond time, and although the difference in the reſults, appeared too trifling to need any attention, it was nevertheleſs biſected, and that point of biſection taken for the meridian,—which is deſignated by AE and terminated by a parallel of latitude drawn through B.—From the point A, a viſta was opened to the ſummit of the hill at B: from B, to C, another viſta was opened, which formed the baſe: the baſe was too ſhort if it could have been avoided; but the hill would not admit of its being any longer.—D the ſignal on the eaſt ſide of the ſwamp.—The angles were meaſured on the horizontal arc of the aſtronomical circle already mentioned.—This inſtrument by means of a vernier is graduated to 5″, which by the help of a microſcope may be eaſily ſubdivided by the eye, into $1\frac{1}{2}$, or 2 ſeconds.—The meaſurements, and angles ſtand as below.

AB = 310.8 perches.
BC = 70.356 perches.
$\angle$ BAE = 37° 58′ 48″
$\angle$ ABD = 57 43 21
$\angle$ BCD = 139 23 58
$\angle$ DBC = 39 47 1
$\angle$ CDB = 0 49 1

From theſe data, AE is found to be equal to 244.9 perches, BE to 191.26 perches, BD to 3211.65 perches, EF to 2987.44 perches, and DF to 316.7 perches. DB being conſidered as an arc of a great circle, forming with the prime vertical an angle of 5° 42′ 9″ to the north, being the exceſs of the angles BAE, and ABD above 90.—From the reſult of the obſervations for the latitude, the obſervatory appeared to be too far north by 518.55 perches, which is deſignated by AH. It therefore follows, that the ſignal at D, was too far north by the ſum of the diſtances DF, EA and AH, which is equal to 1080.15 perches: this diſtance was meaſured due ſouth from the point D, and would interſect the paralell of 31°, at the end of 215 miles and 169.6 perches from high water mark on the Miſſiſſippi.

From the termination of the above mentioned 1080.15 perches, another guide, or compaſs line was continued eaſt, to the eaſt ſide of the Coenecuch; but the termination of the compaſs line, not being in a proper place for a courſe of obſervations, the obſervatory was erected north of it, in the meridian of the termination of the 257th mile; where the following obſervations were made.

1799.


Note. The offsets
Mobile River
Tensaw
216
217
218
219
0.31.
0.68.
0.2.
1.37.

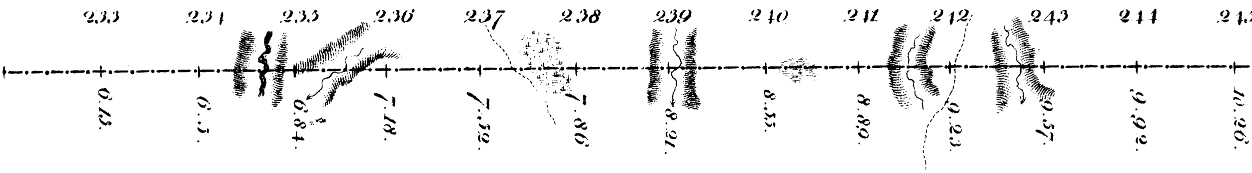
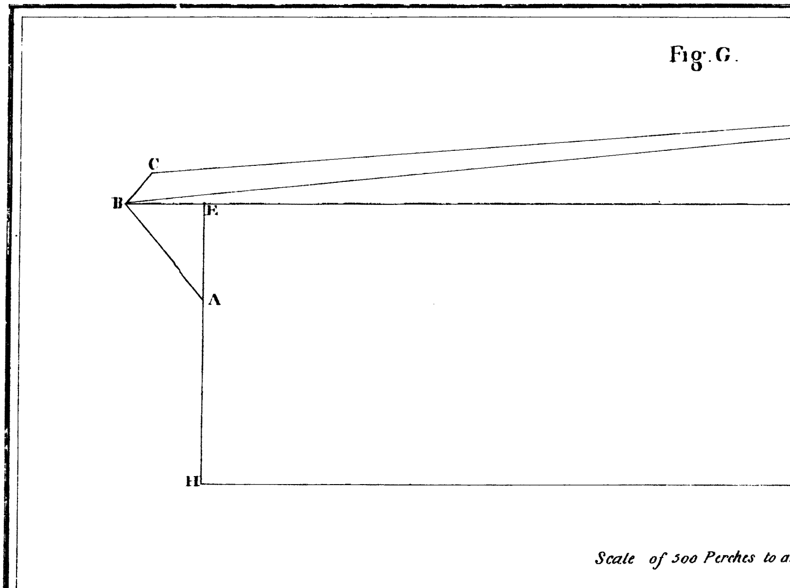
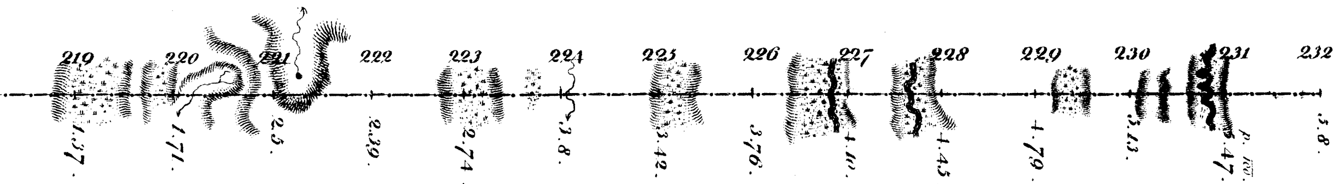
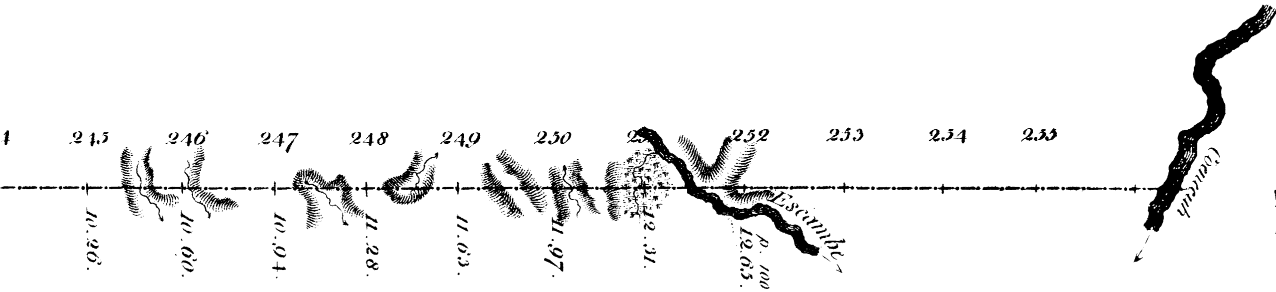

233
234
235
236
237
238
239
240
241
242
243
244
245
6.15.
6.5.
6.84.
7.18.
7.52.
7.86.
8.21.
8.55.
8.89.
9.23.
9.57.
9.92.
10.26.

Fig. G.

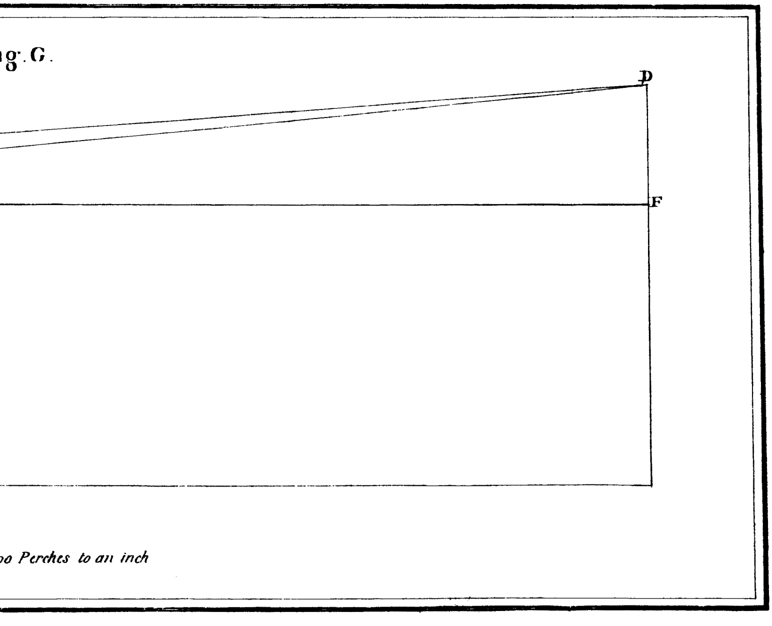

C
B
E
A
H
Scale of 500 Perches to a

…e offsets between the guide line and parrallel of latitude were too small to be laid down on this part of the boundary.





No 5.



1799.
May 9th. The inſtruments arrived, ſet up the clock, and both ſectors, the ſmall one was uſed by the commiſſioner for His Catholic Majeſty, at this ſtation, on the Chatahocha river, the mouth of Flint river, and at our ſtation up the St. Mary's.

Faces of the Sectors to the Eaſt.

				°	′	″	
9th.	Obſerved zenith diſtance of		ε Bootes .	3	4	8	S.
	do.	. . . .	α Coro. Borealis	3	35	53	S.
	do.	Small ſector	α Lyræ .	7	36	43	N.
10th. . .	do.	. . .	ε Bootes .	3	4	9.5	S.
	do.	Small ſector .	do. .	3	3	20	S.
	do.	. . . .	α Coro. Borealis	3	35	55	S.
	do.	Small ſector	α Lyræ .	7	36	48	N.
	do.	. . . .	β Pegaſi .	4	0	12	S.
11th. . .	do.	. . . .	Caſtor .	1	19	12	N.
	do.	. . . .	Pollux .	2	29	41	S.
	do.	. . . .	ε Bootes .	3	4	6.5	S.
	do.	Small ſector .	do. .	3	3	8	S.
	do.	. . . .	α Coro. Borealis	3	35	52	S.
	do.	Small ſector .	do. .	3	35	9	S.
	do.	Small ſector	α Lyræ .	7	37	1	N.
	do.	. . . .	α Andromedæ	3	0	59.5	S.
12th. .	do.	. . . .	Pollux .	2	29	43	S.
	do.	Small ſector	ε Bootes .	3	3	21	S.
	do.	Small ſector	α Coro. Borealis	3	35	7	S.
	do.	Small ſector	α Lyræ .	7	36	52	N.

13th. Turned the face of the Small Sector Weſt.

Cloudy with rain.

14th. Cloudy all day with heavy ſhowers of rain.

15th. Cloudy with rain till after dark, then clear.

			°	′	″	
Obſerved zenith diſtance of	ε Bootes .	ſmall ſector	3	6	47	S.
do. .	α Coro. Borealis	ſmall ſector	3	38	34	S.
do. .	α Lyræ .	ſmall ſector	7	33	30	N.

16th. Cloudy with heavy ſhowers of rain great part of the day.

				°	′	″	
	Obſerved zenith diſtance of		α Andromedæ	3	0	58.5	S.
17th.	do.		Caſtor	1	19	20	N.
	do.		Pollux	2	29	45	S.
	do.	Small ſector	ι Bootes	3	6	58	S.
	do.	Small ſector	α Coro. Borealis	3	38	34	S.
	do.		β Pegaſi	4	0	13	S.
	Face of the large Sector Weſt.						
	do.		α Andromedæ	3	2	41.5	S.
18th.	do.		Caſtor	1	17	30.5	N.
	do.		Pollux	2	31	24	S.
	do.		ι Bootes	3	5	48.5	S.
	do.	Small ſector	do.	3	6	45	S.
	do.		α Coro. Borealis	3	37	27.7	S.
	do.	Small ſector	do.	3	38	22	S.
	do.	do.	α Lyræ	7	33	30	N.
	do.		β Pegaſi	4	1	52.5	S.
	do.		α Andromedæ	3	2	40	S.
19th.	do.		Caſtor	1	17	29.5	N.
	do.		Pollux	2	31	25	S.
	do.		ι Bootes	3	5	47.5	S.
	do.		α Coro. Borealis	3	37	31.8	S.
	do.		β Pegaſi	4	1	52.5	S.
	do.		α Andromedæ	3	2	41.5	S.
20th.	do.		Caſtor	1	17	27	N.
	do.		Pollux	2	31	26	S.
	do.		ι Bootes	3	5	48	S.
	do.		α Coro. Borealis	3	7	29.7	S.
	do.		β Pegaſi	4	1	54	S.
	do.	Small ſector	α Lyræ	7	33	40	N.

At this ſtation, no obſervations but for the determination of the latitude were made,—the eclipſes of Jupiter's ſatellites not being viſible, the planet being too near the ſun.—The clock was put up to advertiſe us of the time a ſtar would appear in the field of the teleſcopes, which is at all times of importance; but at this place particularly ſo, on account of the flies, and muſquitoes, which were ſo numerous, and troubleſome, that an obſervation which would not require more than one minute, could not be made without great pain.

Reſult

Refult of the Obfervations made with the large Sector on the Coenecuch, to determine the Latitude.

The Zenith diftances ftand as below.

Face of the Sector Eaft.

	Caftor.	Pollux.	ε Bootes.	α Coro. Borealis.	β Pegafi.	α Andromedæ.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
May 9th.	....	....	3 4 8 s.	3 35 53.5 s.	....	....
10th.	....	....	3 4 9.5	3 35 55	4 0 12 s.	....
11th.	1 19 12 N.	2 29 41 s.	3 4 6.5	3 35 52	....	3 0 59.5 s
12th.	....	2 29 43	....	....	....	....
16th.	....	....	....	....	....	3 0 58.5
17th.	1 19 10	2 29 45	....	....	4 0 13	....
Means	1 19 11	2 29 43	3 4 8	3 35 53.5	4 0 12.5	3 0 59

Face of the Sector Weft.

	Caftor.	Pollux.	ε Bootes.	α Coro. Borealis.	β Pegafi.	α Andromedæ.
	....	....	....	....	....	3 2 41.5
18th.	1 17 30.5	2 31 24	3 5 48.5	3 37 27.7	4 1 52.5	3 2 40
19th.	1 17 29.5	2 31 25	3 5 47.5	3 37 31.8	4 1 52.5	3 2 41.5
20th.	1 17 27	2 31 26	3 5 48	3 37 29 7	4 1 54	....
Means	1 17 29	2 31 25	3 5 48	3 37 29.7	4 1 53	3 2 41
Means face eaft	1 19 11	2 29 43	3 4 8	3 35 53.5	4 0 12.5	3 0 59
Means	1 18 20	2 30 34	3 4 58	3 36 41.6	4 1 2.7	3 1 50
Refractions	+ 1.3	+ 2.5	+ 3	+ 3.5	+ 4	+ 3
Correct zenith diftances	1 18 21.3	2 30 36.5	3 5 1	3 36 45.1	4 1 6.7	3 1 53
Mean declinations to the 15th.	32 18 47.5 N.	28 29 49.7 N.	27 55 38 N.	27 23 54.1 N.	26 59 58 N.	27 59 3.5 N.
Aberrations	+ 4.4	+ 3 6	— 0.7	— 3.2	— 12 5	— 11.7
Nutations	+ 8.0	+ 8.2	— 0.7	— 2.1	— 6.7	— 5.0
Semi-annual equations	0.0	0.0	+ 0.4	+ 0 4	— 0.5	— 0.4
True declinations	32 18 59.9	28 30 1.5	27 55 37	27 23 49.2	26 59 32.3	27 58 46.4
True zenith diftances applied	—1 18 21.3	+2 30 36.5	+3 5 1	+3 36 45.1	+4 1 6.7	+3 1 53
Latitudes	31 0 38.6	31 0 38	31 0 38	31 0 34.3	31 0 39	31 0 39.4

		°	′	″
Latitude by	Caſtor . .	31	0	38.6
do.	Pollux . ,	31	0	38.0
do.	ι Bootes . .	31	0	38.0
do.	α Coro. Borealis .	31	0	34.3
do.	β Pegaſi . .	31	0	39.0
do.	α Andromedæ .	31	0	39.4
Mean Latitude north	.	31	0	37.9

Reſult of the Obſervations made with the ſmall Sector on the Coenecuch to determine the Latitude.

The Zenith diſtances ſtand as below.

Face of the Sector Eaſt.

	ι Bootes. ° ′ ″	α Coro. Borealis. ° ′ ″	α Lyræ. ° ′ ″
May 9th.	. . . .	. . . .	7 36 43 N.
10th.	3 3 20 S.	3 35 2 S.	7 36 48
11th.	3 3 8	3 35 9	7 31 1
12th.	3 3 21	3 35 7	7 36 52
Means	3 3 16	3 35 6	7 36 51

Face of the Sector Weſt.

	ι Bootes.	α Coro. Borealis.	α Lyræ.
15th.	3 6 47	3 38 34	7 33 30
17th.	3 6 58	3 38 34	. . . .
18th.	3 6 45	3 38 22	7 33 20
20th.	. . . .	. . . .	7 33 40
Means	3 6 50	3 38 30	7 33 30
Means face eaſt	3 3 16	3 35 6	7 36 51
Means	3 5 3	3 36 48	7 35 10.5
Refractions	+ 3	+ 3.5	+ 7.5
Correct zenith diſtances . . .	3 5 6	3 36 51.5	7 35 18
Mean declinations May 15th. . .	27 55 38 N.	27 23 54.1 N.	38 36 11 N.
Aberrations	— 0.7	— 3.2	— 11.5
Nutations	— 0.7	— 2.1	— 7.0
Semi-annual equations . . .	+ 0.4	+ 0.4	+ 0.2
True declinations . . .	27 55 37	27 23 49.2	38 35 52.7
Zenith diſtances applied . . .	+3 5 6	+3 36 51.5	—7 35 18
Latitudes	31 0 43	31 0 40.7	31 0 34.7

Latitude

		°	′	″
Latitude by	ε Bootis .	31	0	43
do. .	α Coro. Borealis	31	0	40 7
do. .	α Lyræ .	31	0	34.7
Mean Latitude North	.	31	0	39.5

The difference of the refults given by the two inftruments appears to be 1″.6; but the radius of the large fector, being more than three times that of the fmall one, it may fairly be confidered at leaft three times as accurate; and as double the number of ftars were taken with the large one, it is on that account entitled to double the accuracy:—hence if to five times the latitude given by the large fector, the latitude given by the fmall one be added, and the fum divided by fix, the quotient 30° 0′ 38″.1 will be the latitude in which each inftrument has its due weight; from which it follows, that the obfervatory was too far north by 38″.1, or 3853.8 feet; but the end of the guide line was 3617.8 feet fouth of the obfervatory,—hence the end of the guide line was too far north by 236 feet, which was carefully laid off to the fouth, and the guide line corrected back as in the former cafes agreeably to Plate IX. From the termination of the meafurement another guide, or compafs line was carried on to the weft fide of the Chatahocha, or Apalachicola river the diftance of 381 miles, and 7 perches, eaft of high water mark on the Miffiffippi.

At the termination of the compafs, or guide line on the Chatahocha, or Apalachicola river, the following obfervations were made.

July 25th. Arrived at the end of the guide line, in a heavy fhower of rain.

26th. Cloudy with rain all day.

27th. Cleaned, and fet up the clock.—Cloudy with rain.

28th. Cloudy with rain all day.—Thermometer 82° in the morning, fell to 80° at 10 o'clock A. M.

29th. Thermometer 74° in the morning. Thick fog. Thermometer 84° in the afternoon.

Put up both Sectors, with their Faces to the Eaft.

30th. Thermometer 74° in the morning, rofe to 87°.

Obferved

		°	′	″	
Obſerved zenith diſtance of	α Coro. Borealis	3	36	11	S.
do. . .	α Andromedæ	3	1	18.6	S.
do. . .	β Andromedæ	3	32	48	N.
do. ſmall ſector	. do .	3	34	1.5	N.
do. . .	Caſtor .	1	18	38.5	N.
do. . .	Pollux .	2	30	13	S.

31ſt. *Equal altitudes of the Sun.*
A. M. 8^h 44′ 49″. P. M. 3^h 16′ 15″.

		°	′	″	
Obſerved zenith diſtance of	α Coro. Borealis	3	36	8.5	S.
do. . .	α Andromedæ	3	1	21	S.

Immerſion of the 3d ſatellite of ♃ obſerved at 16^h 8′ 18″.—Belts diſtinct, magnifying power 120.

		°	′	″	
Obſerved zenith diſtance of	β Andromedæ	3	32	49.5	N.
do. ſmall ſector	do. .	3	33	58.5	N.
do. . .	β Tauri .	2	34	46.5	S.
do. . . .	Caſtor .	1	18	41	N.
do. . .	Pollux .	2	30	10	S.

Thermometer 74° at ſun riſe, roſe to 86°.

Aug. 1ſt. Thermometer 84° all laſt night.—Heavy rain about 1 o'clock in the morning, cleared off before 3 o'clock.

		°	′	″	
Obſerved zenith diſtance of	β Pegaſi .	4	0	26	S.
do. ſmall ſector	do. .	3	59	9	S.
do. . .	α Andromedæ	3	1	22.5	S.
do. ſmall ſector	. . .	3	0	19	S.

The above two obſervations are doubtful, the ſtar not being ſeen more than 3″ through the clouds.

Thermometer roſe to 88°, frequent light ſhowers.

2d. Thermometer 74° all laſt night, roſe to 84°.—Showery with thunder great part of the day.

Equal

Equal altitudes of the Sun.
A. M. 9^h 30′ 13″. P. M. 2^h 9′ 50″.

Obferved zenith diftance of α Lyræ (fmall fector) 7° 37′ 30″ N.

3d. Thermometer 75° all laft night, rofe to 85°.—Clouds flying with great rapidity the fore part of the day from the N. W. cleared off in the afternoon.

			°	′	″	
Obferved zenith diftance of		α Coro. Borealis	3	36	7.5	S.
do.	fmall fector	α Lyræ .	7	37	36	N.
do.	. . .	β Pegafi .	4	0	25	S.
do.	fmall fector	do. .	3	59	3	S.

The obfervations on β Pegafi are doubtful, the ftar was difcerned for a few feconds only between the clouds as they paffed by.

Cloudy the remainder of the night.—At 21^h the clouds difappeared, at 22^h 15′ the fky was fine, at 22^h 20′ I prepared to obferve the zenith diftance of Caftor, but in lefs than 2 minutes, an extenfive cloud formed in the zenith, with feveral others to the northward, they all difappeared in about 5 minutes but the obfervation was loft.

Obferved zenith diftance of Pollux . 2° 30′ 14″ S.

4th. Thermometer 73° all laft night, rofe to 87° in the afternoon.

			°	′	″	
Obferved zenith diftance of		α Coro. Borealis	3	36	8.5	S.
do.	(fmall fector)	α Lyræ .	7	37	12	N.
do.	. . .	β Pegafi .	4	0	28	S.
do.	fmall fector	do. .	3	59	12	S.
do.	fmall fector	α Andromedæ	3	0	28	S.
do.	. . .	β Andromedæ	3	32	49	N.
do.	fmall fector	do. .	3	34	7.5	N.
do.	. . .	β Tauri .	2	34	47.5	S.
do.	. . .	Caftor .	1	18	36.4	N.
do.	. . .	Pollux .	2	30	12	S.

5th. Thermometer 72° all laſt night, roſe to 84°.

Face of the large Sector Weſt.

			°	′	″	
Obſerved zenith diſtance of	α Lyræ	(ſmall ſector)	7	37	36	N.
do. . .	β Pegaſi	do.	3	59	24	S.
do. . .	α Andromedæ	do.	3	0	16	S.
do. . .	β Andromedæ	do.	3	34	1	N.

6th. Thermometer 71° all night, roſe to 79°. —Cloudy all day, clear in the evening.

Face of the ſmall Sector Weſt.

			°	′	″	
Obſerved zenith diſtance of	β Pegaſi	.	4	2	9	S.
do. ſmall ſector	do.	.	4	3	36	S.
do. . .	α Andromedæ		3	3	5.5	S.
do. ſmall ſector	do.	.	3	4	30	S.
do. . .	β Andromedæ		3	31	5	N.
do. ſmall ſector	do.	.	3	29	30	N.
do. . .	Pollux	.	2	30	0.5	S.

7th. Thermometer 70° all night, roſe to 82°. —Cloudy part of the forenoon and rain in the evening.

Obſerved zenith diſtance of β Pegaſi . 4° 2′ 7″.5 S.

At 14^h the ſtars were inſtantly covered by clouds, which were followed by heavy rain.

8th. Thermometer 70° all night, roſe to 79°. —Heavy rain till 7 o'clock in the evening, cleared off at 8^h P. M.

			°	′	″	
Obſerved zenith diſtance	β Pegaſi	.	4	2	6.5	S.
do. ſmall ſector	do.	.	4	3	21	S.
do. . .	α Andromedæ		3	3	4.5	S.
do. ſmall ſector	do.	.	3	4	15	S.
do. . .	β Andromedæ		3	31	5.5	N.
do. ſmall ſector	do.	.	3	30	01	

August

Aug. 9th. Thermometer 70° in the morning, rofe to 75°.—Heavy rain all the forenoon, cleared off at noon.—Thunder-guft in the afternoon, clear in the evening.

				°	′	″	
Obferved zenith diftance of	α Lyræ	(fmall fector)		7	32	45	N.
do. . .	β Pegafi	.	do.	4	3	22.5	S.
do. . .	α Andromedæ		do.	3	3	4.5	S.
do. fmall fector	do.	.	.	3	4	27	S.
do. . .	β Andromedæ		.	3	31	7.5	N.
do. fmall fector	do.	.	.	3	29	31	N.

At $19^h\ 20'$ a cloud formed in the zenith which in a few minutes extended in a belt almoft to the eaftern and weftern horizon, at 20^h it difappeared, by this circumftance the obfervation on β Tauri was loft.

		°	′	″	
Obferved zenith diftance of Caftor	.	1	16	57.5	N.
do. . . Pollux	.	2	31	58.5	S.

The obfervations on Caftor, and Pollux are fomewhat doubtful, each of them being feen but once, and that for a few feconds only between the clouds which moved with great rapidity from the weft, to the eaft.

10th. Thermometer 70° all laft night, raifed to 81°.—Rain at noon.

At $5^h\ 55'$ prepared to obferve the zenith diftance of α Coro. Borealis,—in two minutes a fpace of feveral degrees about the zenith was obfcured by a cloud from the weft, at $6^h\ 6'$ the fky was fufficiently clear but the ftar had paffed the field of the inftrument.

				°	′	″	
Obferved zenith diftance of	α Lyræ	(fmall fector)		7	33	4.5	N.
do. . .	β Pegafi		do.	4	3	31.5	S.

Cloudy the remainder of the 24 hours.

11th. Thermometer 74° all laſt night, roſe to 86°.—Cloudy with thunder from 3ʰ P. M. till ſome time in the night.

12th. Thermometer 76° at day light, roſe to 85°. —Beautiful ſky till 7ʰ A. M. when it became very cloudy from the N. W.—heavy rain from 1 o'clock P. M. till 9 o'clock A. M. of the

13th. Thermometer 72° at ſun riſe, roſe to 81°. —Clear a ſhort time about 9ʰ A. M.—Cloudy with frequent ſhowers of rain the remainder of the day.

14th. Thermometer 74° at ſun riſe, roſe to 82°.

			°	′	″	
Obſerved zenith diſtance of	α Coro. Borealis		3	37	56	S.
do. ſmall ſector	α Lyræ	.	7	33	1.5	N.
do. . .	Pollux	.	2	32	0.5	S.

It was too hazy to diſcover Caſtor, and Pollux was ſcarcely diſcernible.

15th. Thermometer 74° at ſun riſe, roſe to 87°. —Fog during the morning.

			°	′	″	
Obſerved zenith diſtance of	α Coro. Borealis		3	37	56.5	S.
do. ſmall ſector	α Lyræ	.	7	33	4.5	
do. . .	β Tauri	.	2	36	32	S.
do. . .	Caſtor	.	1	16	54	N.

The obſervation on Caſtor is very doubtful being not ſeen more than 3″ between the clouds.

Obſerved zenith diſtance of Pollux . 2° 32′ 1″.5

16th. Thermometer 78° at ſun riſe, roſe to 88°. —Thunder-guſt in the afternoon.—Cloudy with rain the remainder of the 24 hours.

17th.

17th. Thermometer 73° at ſun riſe, roſe to 87°. —Cloudy all day and night.

Obſerved zenith diſtance of β Tauri . 2° 36′ 33″ s.

18th. Thermometer 70° at ſun riſe, roſe to 81°.

Obſerved zenith diſtance of α Coro. Borealis 3° 37′ 59″.5 s.

Cloudy during the night.

19th. Thermometer 70° at ſun riſe, roſe to 74°. —Showery all the afternoon.

Obſerved zenith diſtance of β Tauri 2° 36′ 30″.5 s.

After this obſervation it was cloudy the remainder of the day.

20th. Thermometer 71° at ſun riſe, roſe to 80°. —The morning remarkably fine and clear, wind from the eaſt,—at 9^h A. M. it almoſt inſtantly became cloudy from the ſouth, and between noon and 1 o'clock, a guſt of rain accompanied with large hail ſtones from the S. W. paſſed about four miles to the north of our camp.

End of the obſervations made on the Chatahocha.

		h	′	″	Daily loſs. ″
Clock too ſlow mean time July 31ſt.	.	0	5	22	
do. . . Aug. 2d.	.	0	5	46	. . 12

Longitude weſt from Greenwich by the immerſion of the 3d ſatellite of ♃ on the 31ſt of July 5^h 37′ 59″.

Refult of the Obfervations made with the Large Sector on the Chatahocha, for the determination of the latitude.

The Zenith Diftances when arranged ftand as below.

	β Andromedæ. ° ′ ″	β Tauri. ° ′ ″	Caftor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″	β Pegafi. ° ′ ″	α Andromedæ. ° ′ ″
Face of the Sector Eaft.							
July 30th.	3 32 48 N.	2 34 45.5 S.	1 18 35.5 N.	2 30 13 S.	3 36 11 S.		3 1 18.6 S.
31ft.	3 32 49.5	2 34 46.5	1 18 41	2 30 10	3 36 8.5		3 1 21
Auguft 1ft.						4 0 26 S.	3 1 22.8
3d.				2 30 14	3 36 7.5	4 0 25	
4th.	3 32 49.5	2 34 47.5	1 18 36.4	2 30 12	3 36 8.5	4 0 28	
Means	3 32 49	2 34 46.5	1 18 38	2 30 12.2	3 36 8.9	4 0 26.3	3 1 20.8
Face of the Sector Weft.							
6th.	3 31 5			2 32 0.5		4 2 9	3 3 5.5
7th.						4 2 7.5	
8th.	3 31 5.5					4 2 7.5	3 3 3.5
9th.	3 31 7.5		1 16 57.5	2 31 58.5			3 3 45
14th.				2 32 0.5	3 37 56		
15th.		2 36 32	1 16 54	2 32 1.5	3 37 56.5		
17th.		2 36 33					
18th.					3 37 59.5		
19th.		2 36 30					
Means	3 31 6	2 36 31.7	1 16 55.7	2 32 0.5	3 37 57.3	4 2 8	3 3 4.5
Means face eaft	3 32 49	2 34 46.5	1 18 38	2 30 12.2	3 36 8.9	4 0 26.3	3 1 20.8
Means	3 31 57.5	2 35 39.1	1 17 46.8	2 31 6.3	3 37 3.1	4 1 17.1	3 2 12.6
Refractions	+ 3.5	+ 2.6	+ 1.3	+ 2.5	+ 3.6	+ 4.0	+ 3.0
True zenith diftances	3 32 1.0	2 35 41.7	1 17 48.1	2 31 8.8	3 37 6.7	4 1 21.1	3 2 15.6

Mean

	β Andromedæ.	β Tauri.	Caſtor.	Pollux.	α Coro. Borealis.	β Pegaſi.	α Andromedæ.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Mean declinations Aug. 8th.	34 33 17.2 N.	28 25 28.9 N.	32 18 51.3 N.	28 29 50 N.	27 23 53.5 N.	26 59 50.3 N.	27 59 7 N.
Aberrations	— 5.0	— 2.4	+ 0.8	+ 3.2	+ 13.7	+ 0.5	— 7.2
Nutations	— 2.7	+ 6.0	+ 8.4	+ 9.1	— 2.7	— 6.5	— 4.7
Semi. ann. equations . .	+ 0.4	— 0.4	— 0.4	— 0.3	0.0	+ 0.4	+ 0.4
True declinations . . .	34 33 9.9	28 25 32.1	32 19 0.1	28 30 2.0	27 24 4.5	26 59 44.7	27 58 55.6
True zenith diſtances applied	—3 32 1	+2 35 41.7	—1 17 48.1	+2 31 8.8	+3 37 6.7	+4 1 21.1	+3 2 15.6
Latitudes	31 1 8.9 N.	31 1 13.8 N.	31 1 12 N.	31 1 10.8 N.	31 1 11.2 N.	31 1 5.8 N.	31 1 11.2 N.

		°	′	″
Latitude by	β Andromedæ	31	1	8 9
do.	β Tauri	31	1	13.8
do.	Caſtor	31	1	12
do.	Pollux	31	1	10.8
do.	α Coro. Borealis	31	1	11.2
do.	β Pegaſi	31	1	5.8
do.	α Andromedæ	31	1	11.2
Mean latitude north	. . . .	31	1	10.5

Reſult

Refult of the Obfervations made with the Small Sector on the Chatahocha, for the determination of the Latitude.

The Zenith Diftances ftand as below.

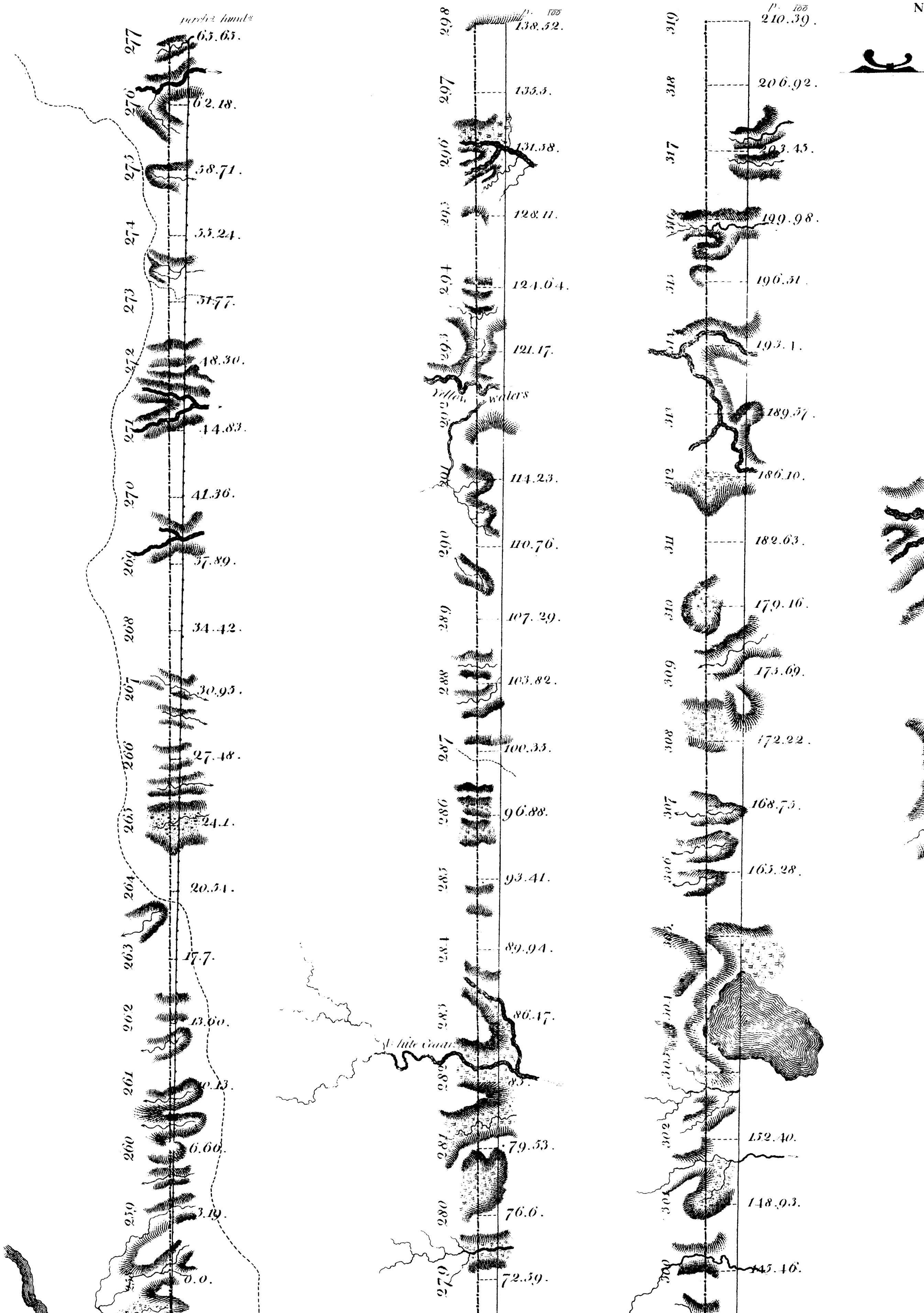
Face of the Sector Eaft.

	β Andromedæ. ° ′ ″	α Lyræ. ° ′ ″	β Pegafi. ° ′ ″	α Andromedæ. ° ′ ″
July 30th.	3 34 1.5 N.	. . . .	. . . .	. . . .
31ft.	3 33 58.5	. . . .	. . . .	. . . .
Auguft 1ft.	. . . .	. . . .	3 59 9 S.	3 0 19 S.
2d.	. . . .	7 37 30 N.	. . . .	. . . .
3d.	. . . .	7 37 36	. . . .	. . . .
4th.	3 34 7.5	7 37 12	3 59 12	3 0 28
5th.	3 34 1.5	7 37 36	3 59 24	3 0 16
Means	3 34 2.2	7 37 28.5	3 59 15	3 0 21

Face of the Sector Weft.

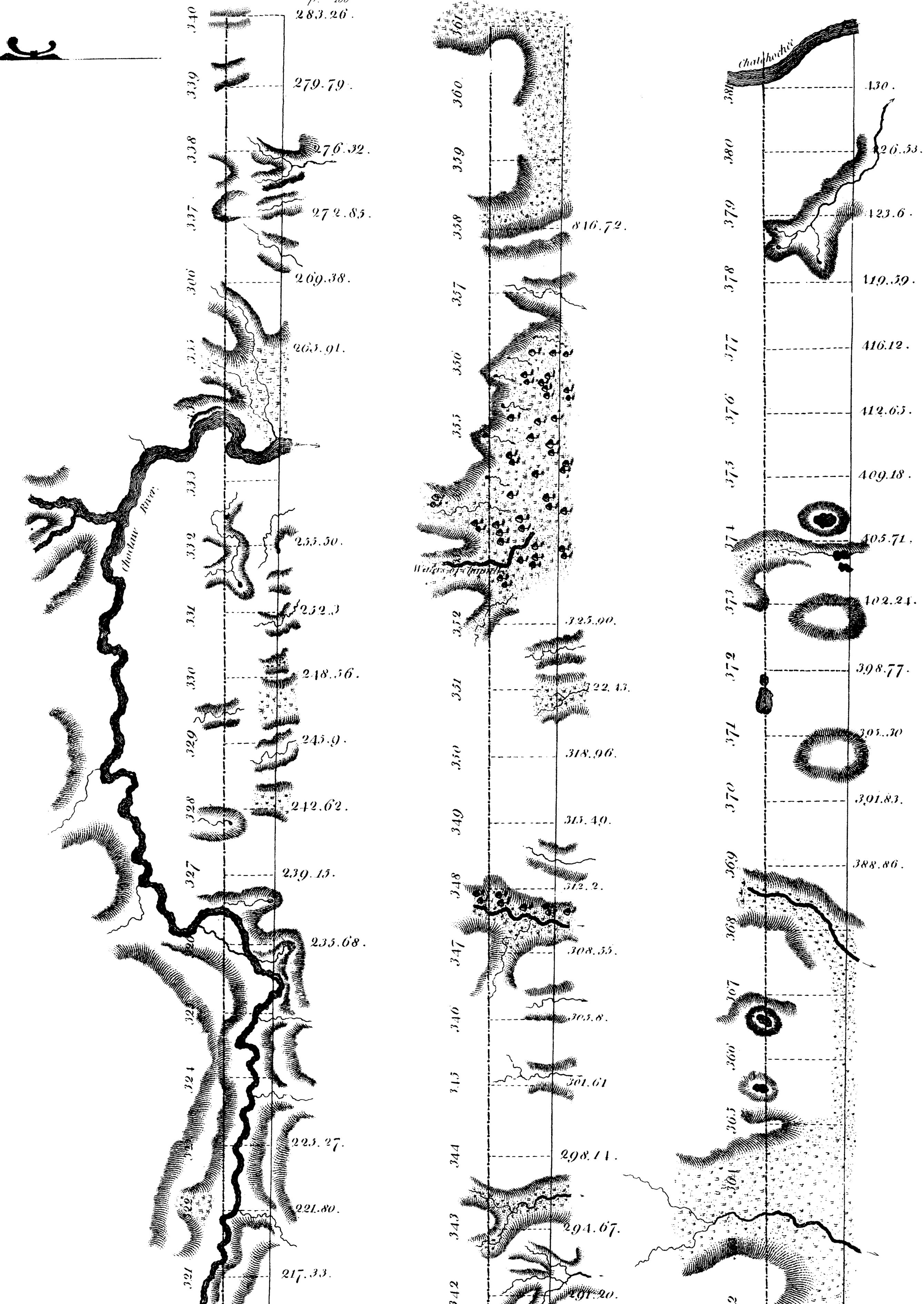
	β Andromedæ.	α Lyræ.	β Pegafi.	α Andromedæ.
6th.	3 29 30	. . . .	4 3 36	3 4 30
8th.	3 30 1	. . . .	4 3 21	3 4 15
9th.	3 29 31	7 32 45	4 3 22	3 4 27
10th.	. . . .	7 33 4.5	4 3 31.5	. . . .
14th.	. . . .	7 33 1.5	. . . .	. . . .
15th.	. . . .	7 33 4.5	. . . .	. . . .
Means	3 29 41	7 32 58.9	4 3 27.6	3 4 24
Means face eaft	3 34 2.2	7 37 28.5	3 59 15	3 0 21
Means	3 31 51.6	7 35 13.7	4 1 21.3	3 2 22.5
Refraction	+ 3.5	+ 7.6	+ 4.0	+ 3
True zenith diftance	3 31 55.1	7 35 21.3	4 1 25 3	3 2 25.5

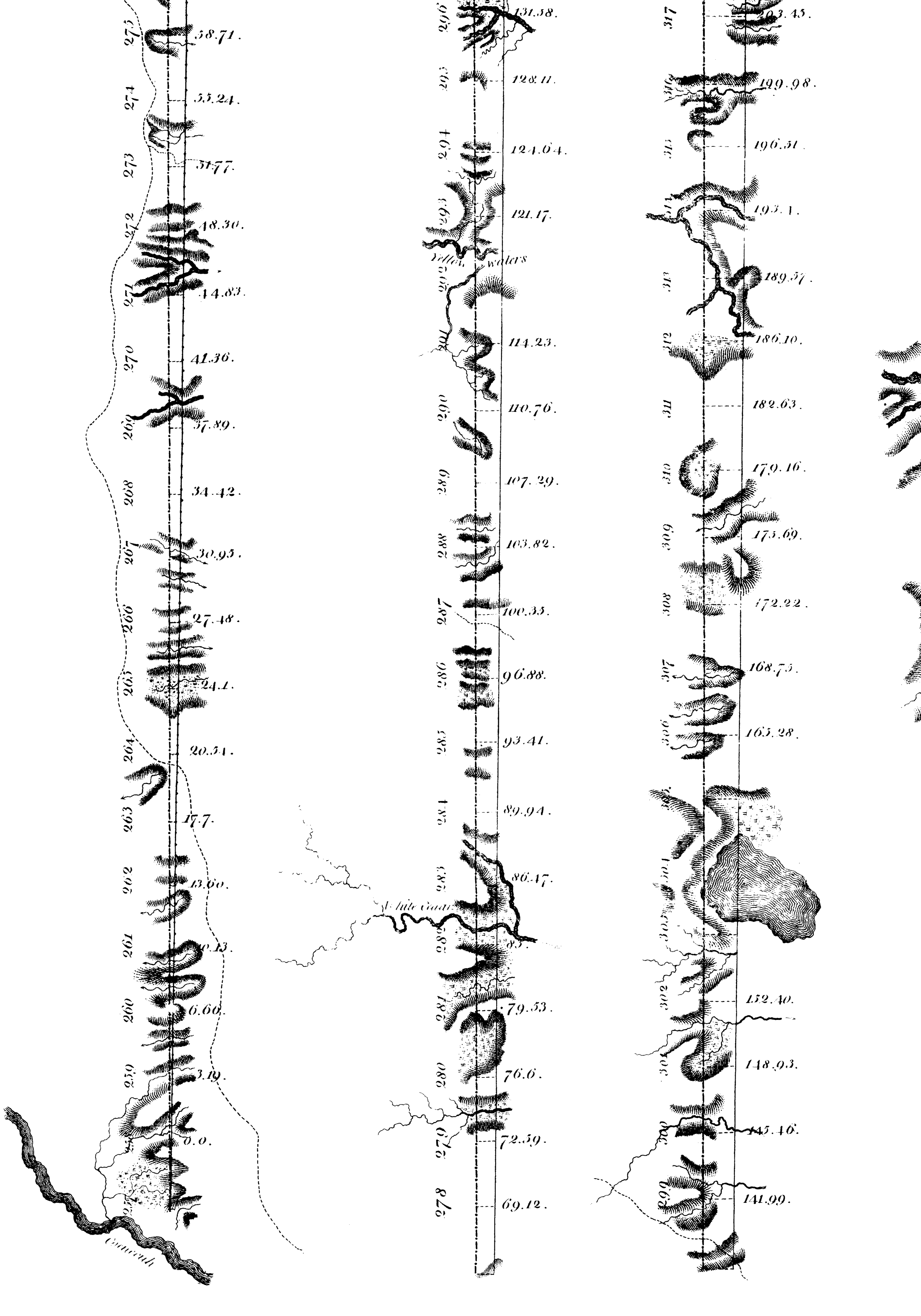
	β Andromedæ.	α Lyræ.	β Pegafi.	α Andromedæ.
Mean declination Auguft 8th.	34 33 17.2 N.	38 36 9.2 N.	26 59 50.3 N.	27 59 7 N.
Aberrations	— 5.0	+ 11.5	+ 0.5	— 7.2
Nutations	— 2.7	— 7.8	— 6.5	— 4.7
Semi-annual equations	+ 0.4	0.0	+ 0.4	+ 0.4
True declinations	34 33 9.9	38 36 12.9	26 59 44.7	27 58 55.5
True zenith diftances applied	—3 31 55.1	—7 35 21.3	+4 1 25.3	+3 2 25.5
Latitudes	31 1 14.8	31 0 51.6	31 1 10.0	31 1 21.0



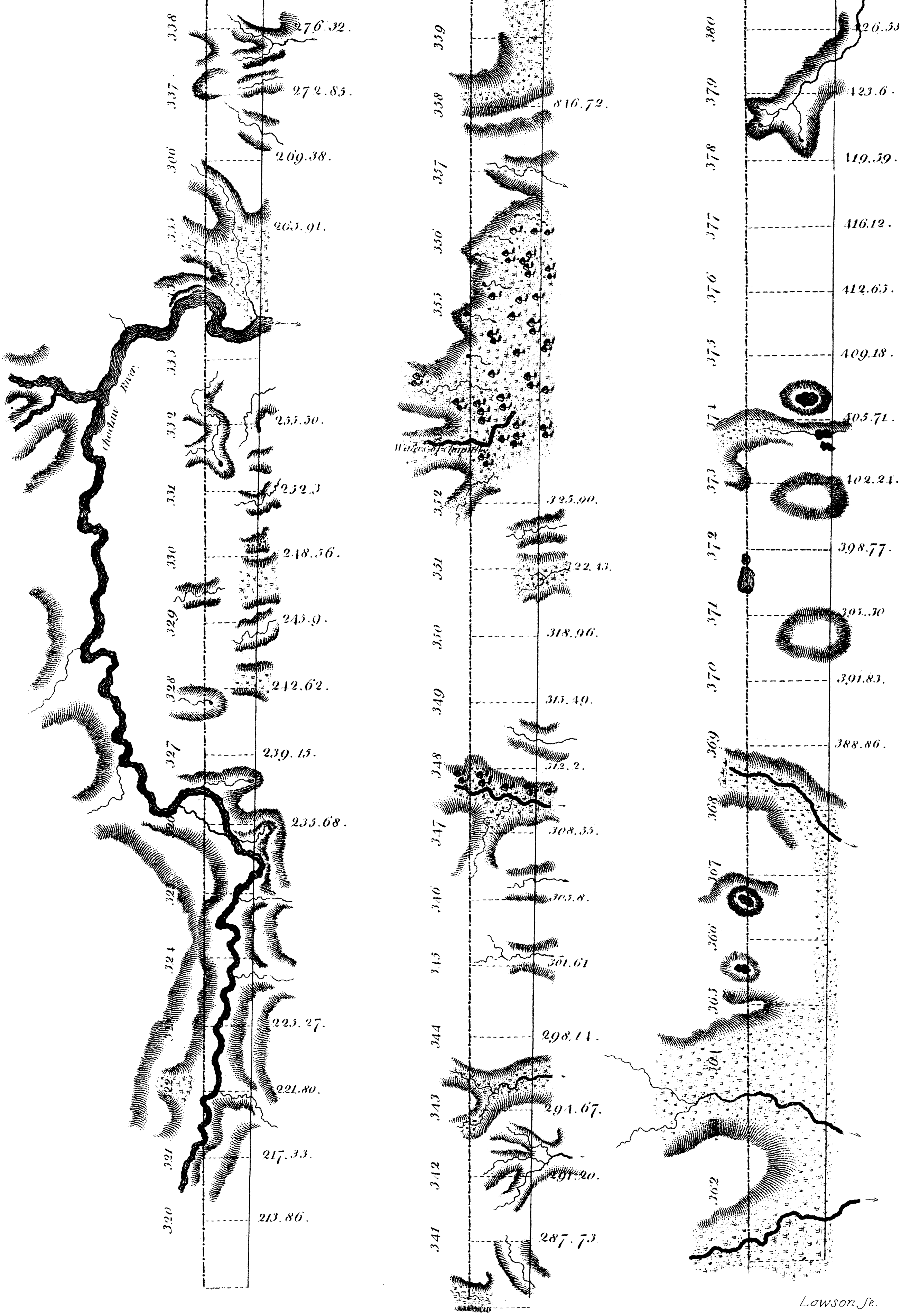
65.65.
62.18.
58.71.
55.24.
51.77.
48.30.
44.83.
41.36.
37.89.
34.42.
30.95.
27.48.
24.1.
20.54.
17.7.
13.60.
6.60.
3.19.
0.0.
138.52.
135.5.
131.58.
128.11.
124.64.
121.17.
Yellow waters
114.23.
110.76.
107.29.
103.82.
100.35.
96.88.
93.41.
89.94.
86.47.
79.53.
76.6.
72.59.
210.39.
206.92.
199.98.
196.51.
189.57.
186.10.
182.63.
179.16.
175.69.
172.22.
168.75.
165.28.
152.40.
148.93.

N° 6


p. 100?
Chatahochie
Choctaw River
283.26.
279.79.
276.32.
272.85.
269.38.
265.91.
255.50.
252.3
248.56.
245.9.
242.62.
239.15.
235.68.
225.27.
221.80.
217.33.
816.72.
325.90.
322.43.
318.96.
315.49.
312.2.
308.55.
305.8.
301.61
298.14.
294.67.
291.20.
430.
426.53.
423.6.
419.59.
416.12.
412.65.
409.18.
405.71.
402.24.
398.77.
395.30
391.83.
388.86.



275
58.71.
274
55.24.
273
51.77.
272
48.30.
271
44.83.
270
41.36.
269
37.89.
268
34.42.
267
30.95.
266
27.48.
265
24.1.
264
20.54.
263
17.7.
262
13.60.
261
10.13.
260
6.66.
259
3.19.
0.0.
296
131.58.
295
128.11.
294
124.64.
293
121.17.
Yellow waters
114.23.
290
110.76.
289
107.29.
288
103.82.
287
100.35.
286
96.88.
285
93.41.
284
89.94.
283
86.47.
79.53.
280
76.6.
279
72.59.
278
69.12.
317
203.45.
199.98.
196.51.
193.04.
189.57.
312
186.10.
311
182.63.
310
179.16.
309
175.69.
308
172.22.
307
168.75.
165.28.
152.40.
148.93.
145.46.
141.99.


338
276.32
337
272.85
269.38
265.91
332
255.50
331
252.3
330
248.56
329
245.9
328
242.62
327
239.15
235.68
324
225.27
221.80
321
217.33
320
213.86
359
358
316.72
357
325.90
351
322.43
318.96
349
315.49
348
312.2
347
308.55
305.8
301.61
344
298.14
343
294.67
342
291.20
341
287.73
380
426.53
379
423.6
378
419.59
377
416.12
376
412.65
409.18
405.71
402.24
372
398.77
371
395.30
370
391.83
369
388.86
368
362

Lawson Sc.

		°	′	″
Latitude by	β Andromedæ	31	1	14.8
do.	α Lyræ	31	0	51.6
do.	β Pegasi	31	1	10 0
do.	α Andromedæ	31	1	21 0
Mean latitude north		31	1	9.4

From the foregoing determinations it appears that the latitude given by the large sector, exceeds that given by the small one, 1″.1; but as the result given by the large one, all circumstances brought into view, may be considered five times as accurate as that by the small one: If therefore to five times the latitude given by the large sector, the latitude by the small one be added, and the sum divided by six, the quotient 31° 1′ 10″ may be taken as the true latitude of the observatory; which exceeds the parallel of 31° by 1′ 10″, or about 7110.5 feet, which distance was carefully laid off to the south, and the line corrected back as heretofore agreeably to plate X.—From the end of the last mentioned correction, a map, or chart of the river Chattahocha, or Apalachicola, was taken to the mouth of Flint river (see Plate N° XI.) but the mouth of Flint river not being a proper place for a course of observations, we encamped on a commanding eminence where the following observations were made.

Aug. 23d. Thermometer 91° in the afternoon.

24th. Set up the clock, and equal altitude instrument.—Thermometer 75° at sun rise, rose to 91°.

Began the observatory.

25th. *Equal altitudes of the Sun.*

A. M. 8^h 35′ 23″. P. M. 3^h 22′ 14″.

Thermometer 74° at sun rise, rose to 88°.—Finished the observatory and set up

Both Sectors, with their faces to the East.

Shower between 12 and 1 o'clock, cleared off in a short time, cloudy in the evening.

Observed zenith distance of Castor . 1° 37′ 42″ N.

26th.

26th. *Equal altitudes of the Sun.*
A. M. 9^h 27′ 28″. P. M. 2^h 29′ 34″.

Thermometer 76° at ſun riſe, roſe to 85°. —Shower of rain at noon, cloudy at 3 o'clock P. M. followed by a heavy rain. During this long continuation of rainy weather, the winds have been very light, and ſcarcely perceptible even when the clouds moved with prodigious rapidity. The winds have occupied no particular portion of the horizon, but have come from all quarters, and that in a ſmall portion of time.—The nights have generally been fairer than the days.

	°	′	″	
Obſerved zenith diſtance of Caſtor .	1	37	43	N.
do. . . Pollux .	2	11	7	S.

27th. Thermometer 74° at ſun riſe, roſe to 96°.

Equal altitudes of the Sun.
A. M. 8^h 6′ 14″. P. M. 3^h 50′ 8″.

			°	′	″	
Obſerved zenith diſtance of		α Lyræ (ſmall ſector)	7	56	18	N.
do.	. .	β Pegaſi . .	3	41	11.3	S.
do.	ſmall ſector	do. . .	3	40	0	S.
do.	. .	α Andromedæ .	2	42	8	S.
do.	ſmall ſector	do. . .	2	40	51	S.
do.	. .	β Andromedæ .	3	52	1.5	N.
do.	ſmall ſector	do. . .	3	52	53	N.
do.	. .	β Tauri . .	2	15	37	S.
do.	. .	Caſtor .	1	37	44	N.
do.	. .	Pollux . .	2	11	8	S.

28th. Thermometer 74° at ſun riſe, roſe to 96°.

Equal altitudes of the Sun.
A. M. 8^h 26′ 6″. P. M. 3^h 29′ 42″.

At

At half paſt 4 o'clock P. M. the ſky to the north loſt its fine blue, and became of a whitiſh brown, which in a ſhort time extended over the whole hemiſphere, and broke into ſmall clouds.—The evening was very diſtreſſing, the atmoſphere hazy, and ſuffocating, and not a breath of air perceptible till about 8 o'clock P. M. when we had a light breeze from the eaſt, which cleared, and corrected the atmoſphere.

			°	′	″	
Obſerved zenith diſtance of		β Pegaſi	3	41	13	S.
do.	ſmall ſector	do.	3	40	42	S.
do.	. . .	α Andromedæ	2	42	8.5	S.
do.	ſmall ſector	do.	2	41	0	S.
do.	. . .	β Andromedæ	3	52	2.5	N.
do.	ſmall ſector	do.	3	53	11	N.

29th. Fog in the morning, ſucceeded by flying clouds.—Thermometer 80° all laſt night—roſe to 93°.

Obſerved zenith diſtance of α Coro. Borealis 3° 17′ 4″ S.

Turned the face of the large Sector to the Weſt.

Obſerved zenith diſtance of α Lyræ (ſmall ſector) 7° 56′ 6″ N.

Turned the face of the ſmall Sector to the Weſt.

		°	′	″	
Obſerved zenith diſtance of	β Tauri	2	17	17.5	S.
do.	Caſtor	1	36	0	N.
do.	Pollux	2	12	49	S.

30th. Thermometer 74° at ſun riſe, roſe to 95°.

 Obſerved

			°	′	″	
Obſerved zenith diſtance of		α Coro. Borealis	3	18	45.5	S.
do.	ſmall ſector	α Lyræ .	7	53	9	N.
do.	. . .	β Pegaſi .	3	42	51	S.
do.	ſmall ſector	do. .	3	43	46	S.
do.	. .	α Andromedæ	2	43	46	S.
do.	ſmall ſector	do. .	2	44	48	S.
do.	. . .	β Andromedæ	3	50	22	N.
do.	ſmall ſector	do. .	3	49	39	N.
do.	. .	β Tauri .	2	17	16	S.
do.	. . .	Caſtor .	1	36	3.5	N.
do.	. .	Pollux .	2	12	47	S.

31ſt. Thermometer 76° at ſun riſe, roſe to 93°.

			°	′	″	
Obſerved zenith diſtance of		α Coro. Borealis	3	18	46	S.
do.	ſmall ſector	α Lyræ .	7	52	55	N.
do.	. .	β Pegaſi .	3	42	51	S.
do.	ſmall ſector	do. . .	3	43	33	S.
do.	. .	α Andromedæ .	2	43	44.5	S.
do.	ſmall ſector	do. . .	2	44	38	S.
do.	. .	β Andromedæ .	3	50	23	N.
do.	ſmall ſector	do. . .	3	49	26	N.
do.	. .	β Tauri . .	2	17	17	S.
do.	. .	Pollux .	2	12	47	S.

Sept. 1ſt. Thermometer 74° at ſun riſe, roſe to 94°.

Equal altitudes of the Sun.
A. M. 8h 18′ 37″. P. M. 3h 34′ 41″.

			°	′	″	
Obſerved zenith diſtance of		α Lyræ (ſmall ſector)	7	52	42	N.
do.	. .	β Pegaſi do.	3	43	28	S.
do.	. .	α Andromedæ do.	2	44	38	S.
do.	. .	β Andromedæ do.	3	49	16	N.
do.	. .	Caſtor . .	1	36	3.5	N.

2d. Thermometer 75° at ſun riſe, roſe to 90°.

Equal altitudes of the Sun.
A. M. 8h 27′ 24″. P. M. 3h 25′ 20″.

Cloudy part of the afternoon.

3d.

3d. Thermometer 73° at ſun riſe, roſe to 91°. —Cloudy great part of the day and night.

4th. Thermometer 76° at ſun riſe, roſe to 89°. —Cloudy all the afternoon and night.

5th. Thermometer 74° at ſun riſe, roſe to 87°. —Several ſhowers of rain in the courſe of the day.

Between 13, and 14 hours, traced a meridian by γ Caſſiopeæ, and α Urſæ Minoris.

Emerſion of the 3d ſatellite of ♃ obſerved at $14^h\ 40'\ 35''$. —a little foggy, but the belts were pretty diſtinct, magnifying power of the teleſcope 120.

	h	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument at	19	30	8
The meridian at	19	31	2
The third fibre at	19	31	52

6th. Thermometer 73° at ſun riſe, roſe to 89°. —A fine clear morning, the ſky remarkably blue.

	h	′	″	
☉'s preceding limb on the meridian at	11	54	8	A. M.
Subſequent do. at . . .	11	56	17	A. M.
Centre at	11	55	12.5	A. M.

When the above obſervation was made, the tremor was ſo exceſſive that there was no poſſibility of biſecting the meridional mark with preciſion, nor of examining the line of collimation with the neceſſary accuracy.—Thunder-guſt in the afternoon.

Immerſion of the 1ſt ſatellite of ♃ obſerved at $14^h\ 15'\ 7''$ —Belts diſtinct, magnifying power 120.

	°	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument at	19	26	11
The meridian at	19	27	6
The third fibre at	19	27	56

 7th.

7th. Thermometer 73° at ſun riſe, roſe to 86°.—Heavy ſhower at day break, cloudy great part of the day with a little rain.

			h	′	″
♂ Draconis paſſed the meridian at	:	:	8	1	9
α Aquilæ do. . at	.	.	8	29	36

8th. Thermometer 73° at ſun riſe, roſe to 87°.—Shower at day break.

About 8 o'clock this morning the minute hand of the clock was moved by an impertinent young Indian. The glaſs having been unfortunately broken by which the hands were left expoſed.—The clock was then ſet by my watch.

	h	′	″	
☉'s preceding limb on the meridian at	11	53	27	A. M.
Subſequent do. at	11	55	35	A. M.
Centre at	11	54	31	A. M.

Shower in the afternoon.

		h	′	″
♂ Draconis paſſed the meridian at	:	7	57	10
☽'s weſtern limb on the meridian at	.	8	0	34
α Aquilæ on the meridian at .	.	8	25	36

The obſerved times, and diſtances of the ☽'s weſtern limb from Antares.

	h	′	″	°	′	″	
	8	41	14	39	51	0	
	8	42	28	39	51	20	
	8	43	42	39	52	0	Error of the Sextant add 11″.
	8	44	28	39	52	20	
	8	45	39	39	52	30	
	8	46	54	39	52	50	
Means	8	44	4	39	52	0	

The

The obſerved times, and diſtances of the ☽'s weſtern limb from Fomalhaut.

	h	′	″	°	′	″	
	8	59	5	45	18	0	
	8	59	51	45	17	40	
	9	0	31	45	17	20	
	9	1	18	45	17	10	Error of the Sextant add 11″.
	9	2	9	45	17	0	
	9	3	5	45	16	40	
	9	3	53	45	16	30	
	9	4	43	45	16	0	
Means	9	1	49	45	17	2	

9th. Thermometer 74° at ſun riſe, roſe to 90°. —Thick fog till 8^h A. M.

	h	′	″	
☉'s preceding limb on the meridian at	11	53	6	A. M.
Subſequent do. at . .	11	55	16	A. M.
Centre at . . .	11	54	11	A. M.

♀'s weſtern limb on the meridian at . . 2^h 13′ 45″

Equal altitudes of the Sun.

A. M. 8^h 10′ 23″. P. M. 3^h 37′ 26″.

Theſe equal altitudes are doubtful 3 or 4 ſeconds from fog and clouds.

The obſerved times, and diſtances of the ☽'s weſtern limb from Antares.

	h	′	″	°	′	″	
	6	49	30	52	26	20	
	6	51	11	52	27	0	
	6	52	12	52	27	20	
	6	52	58	52	28	0	Error of the Sextant add 8″.
	6	53	36	52	28	20	
	6	54	31	52	28	20	
	6	55	37	52	28	30	
Means	6	52	48	52	27	41	

The

The obſerved times, and diſtances of the ☽'s weſtern limb α Aries.

	h	′	″	°	′	″	
	8	31	55	95	30	20	
	8	32	55	95	30	0	
	8	33	45	95	29	40	
	8	35	7	95	29	20	Error of the Sextant
	8	36	4	95	29	0	add 8″.
	8	36	53	95	29	0	
	8	37	59	95	28	40	
Means	8	34	57	95	29	26	

☽'s weſtern limb on the meridian at . 8h 56′ 20″

10th. Thermometer 71° at ſun riſe, roſe to 82°. —Foggy.

	h	′	″
Sirius on the firſt fibre of the tranſit inſtrument at	19	11	16
The meridian at	19	12	9
The third fibre at	19	13	0

11th. Thermometer 74° at ſun riſe, roſe to 91°.

Note. The obſervation on Sirius muſt have been entered wrong, or the clock moved about 45″ forward during my abſence yeſterday.

Cloudy all the afternoon with a little rain.

	h	′	″
Immerſion of the 2d ſatellite of ♃ obſerved at	13	12	0
Emerſion of do. at . . .	15	40	32

—Night clear, belts diſtinct, magnifying power 120.

	h	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument at .	19	7	16
The meridian at	19	8	10
The third fibre at	19	9	1

12th. Thermometer 74° at ſun riſe, roſe to 89°. Thunder-guſt at noon.

Equal

Equal altitudes of the Sun.
A. M. $8^h\ 23'\ 0''$. P. M. $3^h\ 24'\ 37''$.

Thefe equal altitudes are doubtful 6 or 7 feconds, on account of clouds which have intervened every afternoon fince the 7th.

	h	′	″
δ Draconis paffed the firft fibre of the tranfit inftrument at .	7	40	11
The meridian at	7	42	15
The third fibre at	7	44	26

α Aquilæ paffed the firft fibre of the tranfit inftrument at .	8	9	50
The meridian at	8	10	41
The third fibre at	8	11	30

Immerfion of the 3d fatellite of ♃ obferved at $16^h\ 6'\ 50''$.—The night remarkably clear and fine, and I do not remember ever to have feen the fatellites, and belts, more beautifully defined.—Magnifying power 120.

	h	′	″
Sirius paffed the firft fibre of the tranfit inftrument at .	19	3	19
The meridian at	19	4	13
The third fibre at	19	5	3

13th. Thermometer 76° at fun rife, rofe to 91°.

	h	′	″
☉'s preceding limb on the meridian at	11	52	28 A. M.
Subfequent do. at . . .	11	54	36 A. M.
Centre at	11	53	32 A. M.

Equal altitudes of the Sun.
A. M. $8^h\ 9'\ 48''$. P. M. $3^h\ 36'\ 56''$.

	h	′	″
δ Draconis paffed the firft fibre of the tranfit inftrument at .	7	36	12
The meridian at	7	38	16
The third fibre at	7	40	28

α Aquilæ paffed the firft fibre of the tranfit inftrument at .	8	5	52
The meridian at	8	6	43
The third fibre at	8	7	32

Immerfion

Immerſion of the 1ſt ſatellite of ♃ obſerved at $16^h\ 9'\ 20''$. —Belts middling diſtinct, magnifying power 120.—The ſatellite diſappeared uncommonly quick after it began to loſe its luſtre.

	°	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument at	18	59	20
The meridian at	19	0	15
The third fibre at	19	1	6

14th. Thermometer 74° at ſun riſe, roſe to 91°. —Cloudy part of the afternoon.

♀'s weſtern limb on the meridian at . $2^h\ 2'\ 45''$

Equal altitudes of the Sun.
A. M. $8^h\ 21'\ 22''$. P. M. $3^h\ 24'\ 38''$.

	°	′	″
Sirius paſſed the firſt fibre of the tranſit inſtrument at	18	55	25
The meridian at	18	56	19
The third fibre at	18	57	9

15th. Thermometer 72° at ſun riſe, roſe to 92°.

	°	′	″	
☉'s preceding limb on the meridian at	11	51	47	A. M.
Subſequent do. at . .	11	53	55	A. M.
Centre at . . .	11	52	51	A. M.

Note. Before the above obſervation was made, upon examining the tranſit inſtrument I found the ſcrew which ſcrews the perpendicular axis was ſlackened, which probably in ſome degree affected the preceding obſervation upon Sirius.

	h	′	″
♀'s weſtern limb upon the meridian at . .	2	0	2
Sirius paſſed the firſt fibre of the tranſit inſtrument at	18	51	31
The meridian at	18	52	25
The third fibre at	18	53	15

16th. Thermometer 76° at ſun riſe, roſe to 96°. —Cloudy part of the afternoon.

☉'s pre-

	h	′	″	
☉'s preceding limb on the meridian at	11	51	26	A. M.
Subsequent do. at . .	11	53	34	A. M.
Centre at . . .	11	52	30	A. M.

	h	′	″
Sirius on the first fibre of the transit instrument at	18	47	38
The meridian at	18	48	31
The third fibre at	18	49	22

End of the observations made at this station.

Examination of the meridian by the transits of δ Draconis, and α Aquilæ.

	h	′	″
Mean A. R. δ Draconis in time to the beginning of 1799.	19	12	27.9
Aberration and preceffion, Sept. 7th.		+	1.8
Nutation . . . . do.		—	0.3
True A. R. δ Draconis	19	12	29.4
Mean A. R. α Aquilæ in time to the beginning of 1799	19	40	58.1
Aberration and preceffion, Sept. 7th. . . .		+	2.8
Nutation . . . . do.		—	0.7
True A. R. α Aquilæ	19	41	0.2
True A. R. δ Draconis	19	12	29.4
Difference	0	28	30.8
In 28′ 30″ sidereal time gains 4″.6 on mean solar time, which is therefore to be deducted		—	4.6
Difference in mean solar time	0	28	26.2
Observed difference in mean solar time on the 7th. .	0	28	27
Error of the meridian to the east	0	0	0.8
Difference in A. R. between δ Draconis, and α Aquilæ on the 8th, mean solar time	0	28	26.2
Observed difference on the 8th	0	28	26.0
Error of the meridian west	0	0	0.2

	h	′	″
Difference in A. R. between δ Draconis and α Aquilæ on the 12th, mean solar time	0	28	26.5
Observed difference on the 12th.	0	28	26
Error of the meridian to the west	0	0	0.5

Difference in A. R. between δ Draconis, and α Aquilæ on the 13th, mean solar time	0	28	26.5
Observed difference on the 13th	0	28	27.0
Error of the meridian to the east	0	0	0.5

Those stars being well situated to detect any error in the meridian, and as the error comes within the probable error of taking an observation, it may be considered sufficiently correct.

Examination of the meridian by the equal altitudes* and transit of the ☉'s centre on the 13th of September.

Equal altitudes of the Sun on that day.

A. M. 8h 9′ 48″. P. M. 3h 36′ 56″

	h	′	″
	3	36	56
Add	12		
	15	36	56
Deduct forenoon's observation	—8	9	48
Divide by	2) 7	27	8
Half	3	43	34
Add forenoon's observation	8	9	48
	11	53	22
Add equation for changes of the ☉'s declination .		+	9.6
☉'s centre on the meridian by equal altitudes at	11	53	31.6
☉'s centre on the meridian by observation at .	11	53	32.0
Difference to the west	0	0	0.4

The

* The equal altitudes before this day were taken with the equal altitude instrument. The cup for holding the water with the roof, for making an artificial horizon being stolen by the Indians, and not returned till the 12th. By a constant practice of 16 years I find the equal altitudes taken from the artificial horizon rather more accurate, than when taken with the equal altitude instrument.

The difference by the above observation likewise comes within the probable error of making an observation.

The rate of the clock's going at this station.

			′	″	daily loss.	
Clock too slow mean time	Aug.	25th.	2	47.5	″	By equal altitudes of the ⊙.
do.		26th.	2	49.4	1.9	
do.		27th.	2	50.9	1.5	
do.		28th.	2	51.0	0.1	
do.	Sept.	1st.	2	53.0	2.0	
					daily gain.	
do.		2d.	2	51.4	1.6	
					0.4	
do.		6th.	2	51		By transits of the ⊙'s centre over the meridian.
do.		8th.	2	51	0.0	
					daily loss.	
do.		9th.	2	51.2	0.2	

On the 10th. between 10^h A. M. and 6^h P. M. the clock was altered about 45″ forward by accident, or otherwise.

		′	″	daily loss.	
Clock too slow mean time	13th.	2	7.4	″	By the transit of the ⊙'s centre over the meridian.
				1	
do.	14th.	2	8.4	daily gain.	By equal altitudes of the ⊙.
				2.4	
do.	15th.	2	6.0		By the transits of the ⊙'s centre over the meridian.
				0.0	
do.	16th.	2	6.0		

Longitude of our observatory as deduced from the eclipses of ♃ satellites and Lunar observations.

		h	′	″	
Sept. 5th.	By an Emersion of the 3d satellite	5	38	58	West from Greenwich.
6th.	Immersion of the 1st do.	5	39	18	
8th.	☽'s distance from Antares	5	36	56	
	do. from Fomalhaut	5	38	30	
9th.	do. from Antares	5	37	39	
	do. from α Aries	5	38	8	
11th.	Immersion of the 2d satellite	5	37	29	
	Emersion do.	5	36	35	
12th.	Immersion of the 3d do.	5	37	3	
13th.	do. 1st do.	5	39	20	

Result

Result of the Obſervations made with the large Sector, at our ſtation near the mouth of Flint River, to determine the Latitude.

The Zenith diſtances ſtand as below.

Face of the Sector Eaſt.

	β Andromedæ.	β Tauri.	Caſtor.	Pollux.	α Coro. Borealis.	β Pegaſi.	α Andromedæ.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Auguſt 25th.	. . . .	. . . .	1 37 42 N.	. . . .	. . . .	. . . .	. . . .
26th.	. . . .	. . . .	1 37 43	2 11 7 S.	. . . .	. . . .	. . . .
27th.	3 52 1.5 N.	2 15 37 S.	1 37 44	2 11 8	. . . .	3 41 11.3 S.	2 42 8 S
28th.	3 52 2.5	. . . .	. . . .	. . . .	. . . .	3 41 13	2 42 8.5
29th.	. . . .	. . . .	. . . .	. . . .	3 17 4 S.	. . . .	. . . .
Means	3 52 2	2 15 37	1 37 43	2 11 7.5	3 17 4	3 41 12.1	2 42 8.2

Face of the Sector Weſt.

	β Andromedæ.	β Tauri.	Caſtor.	Pollux.	α Coro. Borealis.	β Pegaſi.	α Andromedæ.
	. . . .	2 17 17.5	1 36 0	2 12 49	. . . .	. . . .	. . . .
30th.	3 50 22	2 17 16	1 36 3.5	2 12 47	3 18 46	3 42 51	2 43 46
31ſt.	3 50 23	2 17 17	. . . .	2 12 47	3 18 46	3 42 51	2 43 44
Sept. 1ſt.	. . . .	. . . .	1 36 3.5	. . . .	. . . .	. . . .	. . . .
Means	3 50 22.5	2 17 16.8	1 36 2.3	2 12 47.7	3 18 46	3 42 51	2 43 45
Means face eaſt	3 52 2	2 15 37	1 37 43	2 11 7.5	3 17 4	3 41 12.1	2 42 8.2
Means	3 51 12.2	2 16 26.9	1 36 52.6	2 11 57.6	3 17 55	3 42 1.5	2 42 56.6
Refractions	+ 3.8	+ 2.3	+ 1.6	+ 2.2	+ 3.3	+ 3.7	+ 2.7
True zenith diſtances	3 51 16.0	2 16 29.2	1 36 54.2	2 11 59.8	3 17 58.3	3 42 5.2	2 42 59.3

Mean

	β Andromedæ. ° ′ ″	β Tauri. ° ′ ″	Caſtor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″	β Pegaſi. ° ′ ″	α Andromedæ. ° ′ ″
Mean declinations Aug. 28th. .	34 33 18.2 N.	28 25 29.1 N	32 18 51 N.	28 29 56.6 N.	27 23 52.1 N.	26 59 51.3 N.	27 59 8.1 N.
Aberrations	— 1.1	— 2.2	— 0.7	+ 0.5	+ 14.8	+ 4.8	+ 2 5
Nutations	— 2.6	+ 6.8	+ 8.4	+ 8.5	— 2.9	— 6.4	— 4.6
Semi-annual equations . . .	+ 0.4	— 0.4	+ 0.2	+ 0.1	— 0.5	+ 0.2	+ 0 4
True declinations	34 33 14.9	28 25 33.5	32 18 58.9	28 30 5.7	27 24 4.2	26 59 49.9	27 59 6.4
True zenith diſtances applied . .	—3 51 16	+2 16 29.2	—1 36 54.2	+2 11 59.8	+3 17 58.3	+3 42 5.2	+2 42 59.3
Latitudes N.	30 41 58.9	30 42 2.7	30 42 4.7	30 42 5.5	30 42 2.5	30 41 55.1	30 42 5.7

	°	′	″
Latitude by β Andromedæ	30	41	58.9
do. . β Tauri	30	42	2.7
do. . Caſtor	30	42	4.7
do. . Pollux	30	42	5.5
do. . α Coro. Borealis	30	42	2.5
do. . β Pegaſi	30	41	55.1
do. . α Andromedæ	30	42	5.7
Mean Latitude north	30	42	2.2

Reſult

Result of the Observations made with the small Sector, at our station near the mouth of Flint River, to determine the Latitude.

The Zenith Distances arranged stand as below.

Face of the Sector East.

	β Andromedæ. ° ′ ″	α Lyræ. ° ′ ″	β Pegasi. ° ′ ″	α Andromedæ. ° ′ ″
Aug. 27th.	3 52 53 N.	7 56 18 N.	3 40 0 S.	2 40 51 S.
28th.	3 53 11	....	3 40 42	2 41 0
29th.	....	7 56 6	....	....
Means	3 53 2	7 56 12	3 40 21	2 40 55.5
Face of the Sector West.				
30th.	3 49 39	7 53 9	3 43 46	2 44 48
31st.	3 49 26	7 52 55	3 43 33	2 44 38
Sept. 1st.	3 49 16	7 52 42	3 43 28	2 44 38
Means	3 49 27	7 52 55.3	3 43 36	2 44 41
Means face east	3 53 2	7 56 12	3 40 21	2 40 55.5
Means	3 51 14.5	7 54 33	3 41 58.5	2 42 48.2
Refractions	+ 3.8	+ 7.9	+ 3.7	+ 2.7
True zenith distances	3 51 18.3	7 54 40.9	3 42 2.2	2 42 50.9
Mean declinations August 28th.	34 33 18.2 N.	38 36 12.9 N.	26 59 51.3 N.	27 59 8.1 N.
Aberrations	— 1.1	+ 15.2	+ 4.8	+ 2.5
Nutations	— 2.6	— 7.8	— 6.4	— 4.6
Semi. ann. equations	+ 0.4	— 0.3	+ 0.2	+ 0.4
True declinations	34 33 14.9	38 36 20.3	26 59 49.9	27 59 6.4
True zenith distances applied	—3 51 18.3	--7 54 40.9	+3 42 2.2	+2 42 50.9
Latitudes N.	30 41 56.6	30 41 39.4	30 41 52.1	30 41 57.3

		°	′	″
Latitude by	β Andromedæ .	30	41	56.6
do. .	α Lyræ .	30	41	39.4
do. .	β Pegasi ,	30	41	52.1
do. .	α Andromedæ .	30	41	57.3
Mean Latitude North	.	30	41	51.3

From the result of the foregoing observations, the latitude of our observatory by the large sector, comes out 30° 42′ 2″.2 N. and by the small one 30° 41′ 51″.3 N. By proceeding as in the former cases where both sectors were used, and the due weight given each, the latitude appears to be 30° 42′ 0″.4, which we took for the true latitude of the observatory.

The ground about the mouth of Flint river not being fit for encamping on, in consequence thereof, we pitched on the nearest commanding eminence, from which with the least labour in falling the timber, the junction of the rivers might be discovered: In order to connect our work with the junction of the rivers, the following method was pursued. From the observatory A (see Fig. G, Plate XI.) a vista was opened to give us a view of the point of land B, between the rivers. The angle which the line AB made with the meridian AN, we had to determine by measurement, the astronomical circle which was admirably calculated for that purpose, was sent away a few days before (we were compelled by the Indians to leave the country) on account of its weight, as I was informed by the commissioner for His Catholic Majesty! To find the value of this angle, the triangle ANC was formed on the ground.—AN a portion of the meridian was equal to 396.125 feet, AC, a portion of the line in the direction of the junction of the rivers was equal to 496.623 feet, and NC the side opposite to the required angle, was equal to 336.583 feet*—the sides being given, the angle CAN comes out to the nearest second 45° 10′ 19″ west of north. The distance from A to B was found by measurement to be 369 perches, from which by the solution of a plane right-angled triangle, the difference of latitude will be found to be 260.14 perches, or about 42″.4, which added to the latitude of the observatory will give 30° 42′ 42″.8 for the latitude of the junction of the rivers.—The sides of the triangle, with the points of intersection were formed with the utmost accuracy by the transit instrument.

On the 17th day of September, at the time we were preparing to extend the line from the mouth of Flint river to the source of the St. Mary's, the hostile disposition

* The three decimal places annexed to the feet arose from taking the means of many measurements made on each line.

ſition of the Indians, and an attempt to plunder our camp, compelled us to relinquiſh our deſign, and leave the country. On the 9th day of December following we met at the town of St. Mary's, and took into conſideration the further proſecution of our buſineſs, and came to a concluſion,—that we could not attempt with any probability of ſucceſs, more than to determine the ſource of the St. Mary's, with its geographical poſition, until the waters ſhould ſubſide, and the ſwamps be dried by the ſummer heats, which could not be expected in leſs than eight months, added to an oppoſition we had a right to look for from the Indians.—In order to determine the geographical poſition of the river St. Mary's, we erected an obſervatory at Point Peter, near the mouth of the river, as a given point; from whence the latitude, and longitude of the ſource of the river might be determined by meaſurement, if we ſhould fail, either in carrying on our apparatus, or in obtaining a ſufficient number of obſervations for that purpoſe.

At Point Peter the following obſervations were made.

Dec. 14th. Set up the clock.

15th. Cloudy.

16th. Set up the ſmall Sector with the face to the Eaſt.

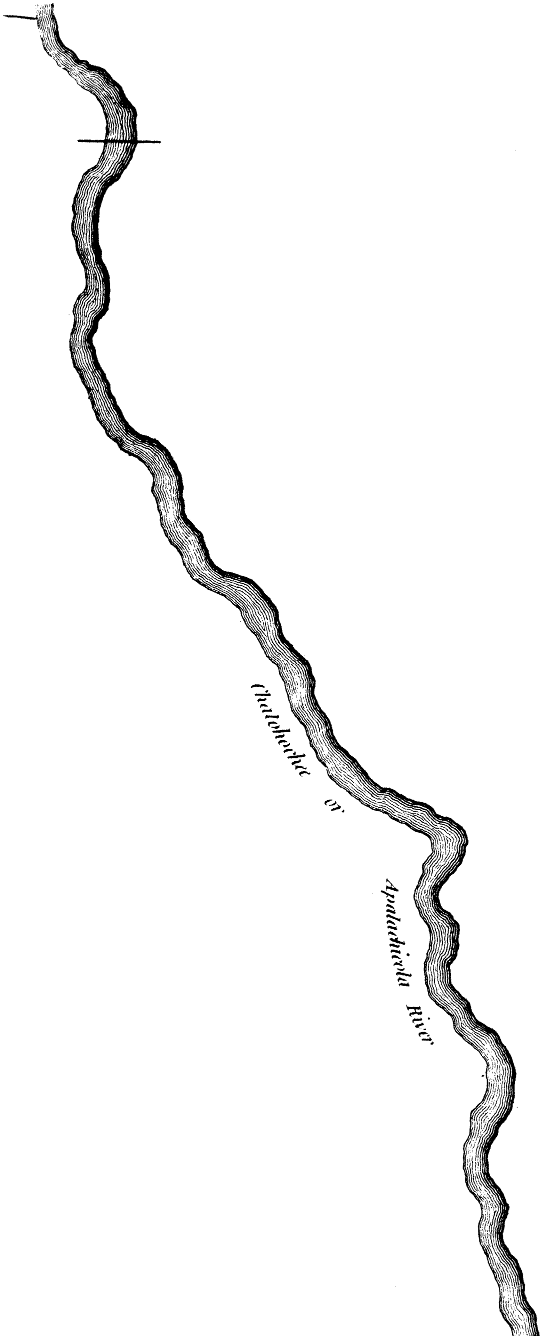
Thermometer 51° at ſun riſe, roſe to 67°.

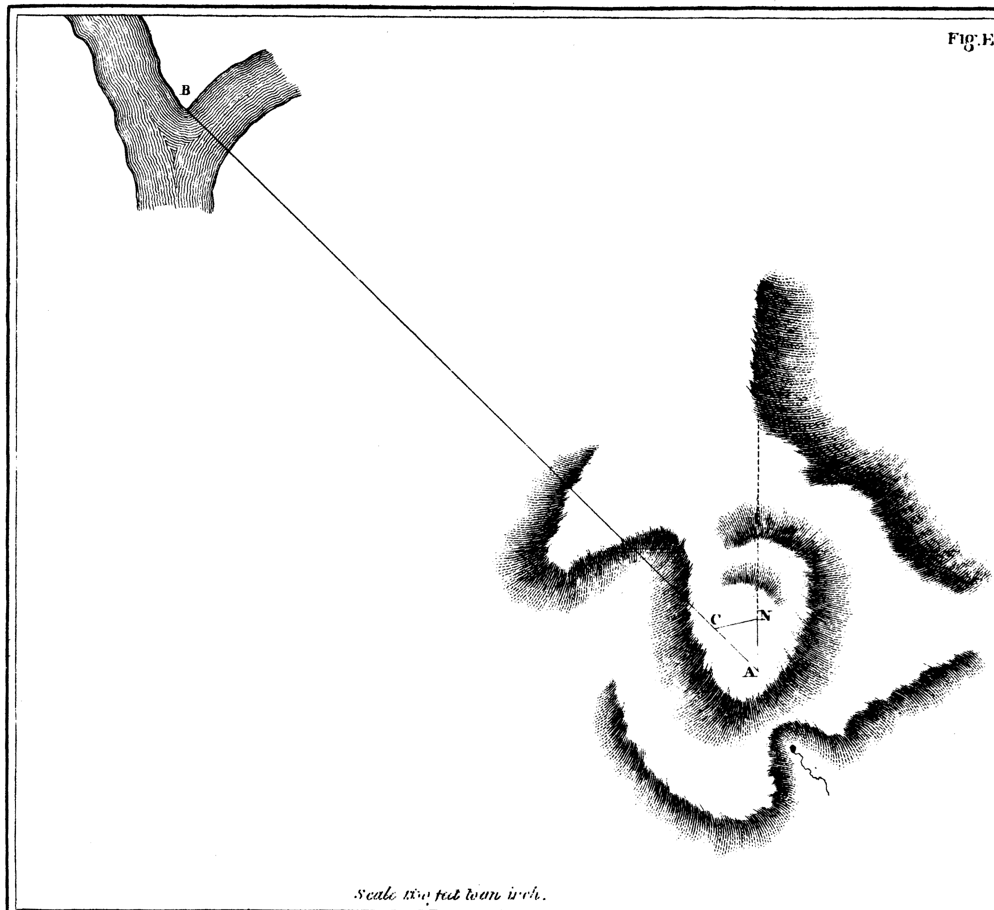
Equal altitudes of the Sun.
A. M. $9^h\ 14'\ 59''$. P. M. $2^h\ 41'\ 7''$.

Theſe equal altitudes are doubtful a few ſeconds, but not more than 4.

Cloudy

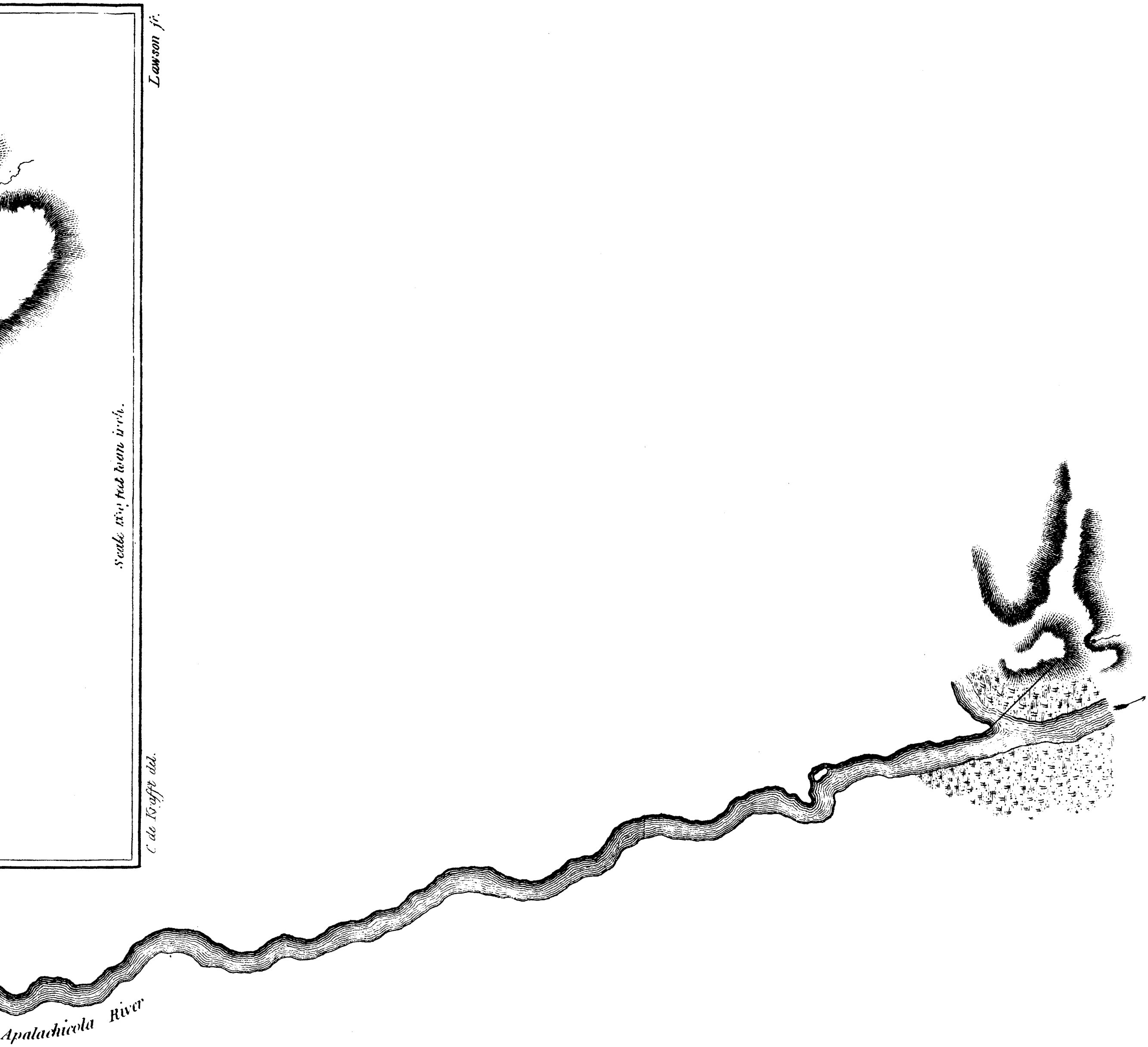
No 7





C. de Krafft del.

Lawson fc.



C. de Krafft del.

Lawson sc.

Cloudy all the afternoon after 3^h P. M. and continued ſo all night.

17th. Fog in the morning, cloudy all day.— Thermometer 57° at ſun riſe, roſe to 70°. Heavy rain at night.

18th. Thermometer 56° at ſun riſe, roſe to 64°. —Fine rain in the morning. Strong wind from the N. E.—Cloudy with rain all the afternoon and night.

19th. Thermometer 55° at ſun riſe, roſe to 69°. —Heavy fog early in the morning.—Flying clouds all day and rain in the evening.

20th. Thermometer 60° at ſun riſe, fell to 58°. —Cloudy all day, fine rain in the morning and a heavy rain at night.

21ſt. Thermometer 59° at ſun riſe, fell to 54° in the afternoon, cloudy with heavy rain moſt of the day.—Wind from the N. W. in the evening.

22d. Thermometer 54° at ſun riſe, roſe to 55°. —Cloudy early in the morning and in the evening.

Obſerved zenith diſtance of α Lyræ . 7° 55′ 37″ N.

Equal altitudes of the Sun.
A. M. 9^h 1′ 32″. P. M. 3^h 7′ 28″.

23d. Thermometer 54° at ſun riſe, roſe to 56°. —Cloudy all laſt night and this day with fine rain, wind S. W. cleared off in the evening with a N. W. wind.

			°	′	″	
Obſerved zenith diſtance of	β Tauri	.	2	15	3	S.
do. . .	Caſtor	.	1	38	12	N.
do. . .	Pollux	.	2	10	38	S.

Emersion of the 1st satellite of ♃ observed at $15^h\ 40'\ 51''$. Night clear, belts distinct, magnifying power 120.

24th. Thermometer 34° at sun rise, rose to 54°.

Observed zenith distance of α Lyræ . 7° 55′ 37″ N.

Equal altitudes of the Sun.
A. M. $9^h\ 22'\ 17''$. P. M. $2^h\ 50'\ 12''$.

		°	′	″	
Observed zenith distance of	α Andromedæ	2	44	22	S.
do. . .	β Andromedæ	3	53	16	N.
do. . .	β Tauri .	2	14	51	S.
do. . .	Castor .	1	38	20	N.

25th. Thermometer 30° at sun rise, rose to 51°.

Observed zenith distance of α Lyræ . 7° 55′ 46″ N.

Equal altitudes of the Sun.
A. M. $9^h\ 20'\ 21''$. P. M. $2^h\ 53'\ 50''$.

Observed zenith distance of	α Andromedæ	2° 41′ 16″	S.
do. . .	β Andromedæ	3 53 16	N.

Emersion of the 1st satellite of ♃ observed at $10^h\ 9'\ 50''$. Night clear, belts distinct, magnifying power 120.

Observed zenith distance of Pollux . 2° 10′ 34″ S.

26th. Thermometer 41° at sun rise, rose to 49°. —Cloudy all day and night.

Turned the face of the Sector West.

27th. Thermometer 50° at sun rise, rose to 64°.

Observed zenith distance of α Lyræ . 7° 48′ 25″.

Equal altitudes of the Sun.
A. M. $9^h\ 19'\ 51''$. P. M. $2^h\ 57'\ 42''$.

Observed

Obſerved zenith diſtance of	α Andromedæ	.	2°	48′	37″	S.
do. . .	β Andromedæ	.	3	45	48	N.

Emerſion of the 2d ſatellite of ♃ obſerved at 7^h 16′ 0″.—Belts diſtinct, magnifying power 120.

			°	′	″	
Obſerved zenith diſtance of	β Tauri	.	2	22	20	S.
do. . .	Caſtor	.	1	30	52	N.
do. . .	Pollux	.	2	17	57	S.
do. . .	α Lyræ*	.	7	48	24	N.

28th. Thermometer roſe to 80°.—Cloudy in the morning.—Wind S. E.

Obſerved zenith diſtance of	α Andromedæ	2°	48′	33″	S.
do. . .	β Andromedæ	3	45	50	N.

29th. Thermometer 67° at ſun riſe, fell to 63° in the afternoon.—Heavy rain great part of the day.—At 10 o'clock P. M. wind ſhifted to the S. W. and blew with great violence,—became clear at ſhort intervals.

			°	′	″	
Obſerved zenith diſtance of	β Tauri	.	2	22	21	S.
do. . .	Caſtor	.	1	31	0	N.
do. . .	Pollux	.	2	17	59	S.

30th. Thermometer 54° at ſun riſe, fell to 44° in the afternoon, and to 33° at 7^h P. M.—Strong N. W. wind with flying clouds.

In the evening finiſhed our meridian by circum polar ſtars, this work was begun on the evening of the 29th.

31ſt. Thermometer 25° at ſun riſe, roſe to 44°.

* On the meridian twice this day from ſidereal time gaining on mean ſolar time.

Equal altitudes of the Sun.
A. M. 9^h 41′ 37″. P. M. 2^h 42′ 19″.

γ Caſſiopeæ paſſed the meridian at .	6^h	11′	37″
Pole ſtar at	6	19	8

1800.

Jan. 1ſt. Thermometer 28° at ſun riſe, roſe to 54°. —Wind N. E. ſcattering clouds from the S. E.

Emerſion of the 1ſt ſatellite of ♃ obſerved at 12^h 6′ 43″. —Belts diſtinct, magnifying power 120.

An immerſion of the 4th ſatellite is entered in the Nautical Almanac to happen at Greenwich at 17^h 18′ 30″, and the emerſion at 18^h 44′ 22″. As the immerſion was to happen but 1′ 32″ from the emerſion of the 1ſt ſatellite, it was a favourable opportunity to make both obſervations at one ſetting. At 12^h I placed myſelf at the teleſcope, and as ſoon as I had adjuſted the inſtrument to my eye, I thought the 4th ſatellite had loſt ſome of its luſtre. After noting the emerſion of the 1ſt ſatellite, I again applied myſelf to the inſtrument, but the 4th ſatellite ſtill continued viſible, and had altered but very little ſince I firſt obſerved it; it was very diſtinct at 12^h 42′, and at 13^h had nearly if not quite recovered its luſtre.

2d. Thermometer 54° all day.—Heavy rain, wind N. E. till evening, ſhifted to the N. W. in the night when it became clear.

3d, Thermometer 39° at ſun riſe, roſe to 53°.

Equal altitudes of the Sun.
A. M. 9^h 27′ 30″. P. M. 3^h 1′ 18″.

Emerſion of the 1ſt ſatellite of ♃ obſerved at 6^h 35′ 39″. —Belts diſtinct, and the planet and ſatellites remarkably well defined, magnifying power 120.

Emerſion of the 2d ſatellite of ♃ obſerved at 9^h 55′ 59″. —Belts and ſatellites very diſtinct, magnifying power 120.

4th. Thermometer 36° at ſun riſe, roſe to 54°.

Equal

Equal altitudes of the Sun.
A. M. $9^h\ 48'\ 45''$. P. M. $2^h\ 41'\ 38''$.

5th. Thermometer 36° at ſun riſe.—Cloudy all day.

6th. Thermometer 34° at ſun riſe, roſe to 61°.

Equal altitudes of the Sun.
A. M. $9^h\ 30'\ 21''$. P. M. $3^h\ 9'\ 3''$.

7th. Thermometer 38° at ſun riſe.—Cloudy all day.

8th. Thermometer 40° at ſun riſe, roſe to 48°.

Emerſion of the 1ſt ſatellite of ♃ obſerved at $14^h\ 3'\ 12''$ —Hazy, neither ♃ nor his ſatellites well defined, magnifying power 120.

9th. Thermometer 38° at ſun riſe, roſe to 42°. —Fine rain part of the day, and rain with hail during the night—wind N. E.

10th. Thermometer 37° at ſun riſe, roſe to 40°. —Snow and hail the whole day! which continued till 10 o'clock in the evening, when the thermometer fell to 32°, the wind ſhifted to N. W. and it became clear at midnight.

11th. Thermometer 28° at ſun riſe, roſe to 40°. —Snow five inches deep.

Equal altitudes of the Sun.
A. M. $9^h\ 36'\ 25''$. P. M. $3^h\ 4'\ 24''$.

12th. Thermometer 34° at ſun riſe, roſe to 67°. —Cloudy great part of the day.

3th. Thermometer 46° at ſun riſe, roſe to 57°. —Cloudy all day.

14th.

14th. Thermometer 40° at ſun riſe, roſe to 62°. —Cloudy.

15th. Thermometer 42° at ſun riſe, roſe to 61°. —Cloudy in the evening.

Equal altitudes of the Sun.
A. M. 9^h 49′ 22″. P. M. 2^h 57′ 0″.

16th. Thermometer 45° at ſun riſe, roſe to 67°.

17th. Thermometer 64° at ſun riſe, fell to 42° in the evening, cloudy in the morning, light ſhower at 11^h A. M. cleared off at noon with a moſt violent wind from the weſt, which ſhifted to the N. W. in the evening.

The obſerved times, and diſtances, of the ☉'s and ☽'s neareſt limbs.

	h	′	″	°	′	″	
	20	40	4	86	23	50	
	20	41	23	86	23	40	
	20	42	7	86	23	10	
	20	42	52	86	22	40	Error of the Sextant add 8″.
	20	43	34	86	22	30	
	20	44	10	86	22	00	
	20	44	48	86	21	55	
	20	45	30	86	21	30	
Means	20	43	3	86	22	39	

Repeated.

	h	′	″	°	′	″	
	21	1	29	86	16	0	
	21	1	58	86	15	50	
	21	2	35	86	15	30	Error of the Sextant add 8″.
	21	3	7	86	15	30	
	21	3	41	86	15	0	
	21	4	13	86	14	40	
Means	21	2	50	86	15	25	

18th.

18th. Thermometer 38° at ſun riſe, roſe to 58°.

Equal altitudes of the Sun.
A. M. 9^h 45′ 10″. P. M. 3^h 5′ 8″.

At 6^h prepared to obſerve the eclipſe of ♃'s 4th ſatellite.—At about 6^h 20′ the ſatellite began to loſe its luſtre, which gradually diminiſhed till about 6^h 46′,—from that time it was not diſcernible with a magnifying power of 50, but diſtinct with 120.—at 7^h 23′ 47″ it was evidently more bright, and at 7^h 35′ had almoſt recovered its uſual brightneſs.

The obſerved times, and diſtances of the ☉'s and ☽'s neareſt limbs.

	h	′	″	°	′	″	
	20	46	32	73	9	30	
	20	47	35	73	9	0	
	20	48	12	73	8	50	
	20	48	44	73	8	30	
	20	49	20	73	8	15	
	20	50	6	73	8	0	Error of the Sextant add 8″.
	20	50	43	73	7	40	
	20	51	18	73	7	30	
	20	51	51	73	7	20	
	20	52	25	73	7	15	
	20	53	0	73	6	0	
Means	20	49	59	73	8	10	

Repeated.

	h	′	″	°	′	″	
	21	15	29	72	59	20	
	21	16	33	72	59	00	
	21	17	9	72	58	50	
	21	17	52	72	58	40	
	21	18	32	72	58	20	Error of the Sextant add 8″.
	21	19	9	72	58	00	
	21	19	40	72	57	40	
	21	20	22	72	57	30	
	21	20	54	72	57	20	
	21	21	20	72	57	0	
Means	21	18	42	72	58	10	

19th. Thermometer 57° at sun rise, rose to 54°.

Equal altitudes of the Sun.
A. M. $10^h\ 1'\ 6''$. P. M. $2^h\ 50'\ 21''$.

These equal altitudes are doubtful 2 or 3 seconds but not more, from the violence of the wind.

Rate of the clock's going at Point Peter.

				′	″	Daily gain. ″
1799. Clock too fast mean time		Dec.	16th.	3	41.2	
	do.		22d.	5	17.6	19.4
	do.		24th.	6	1.1	21.7
	do.		25th.	6	21.7	20.6
	do.		27th.	7	2.4	20.3
	do.		31st.	8	16.0	18.4
1800.	do.	Jan.	3d.	9	16.0	20.1
	do.		4th.	9	35.9	19.6
	do.		6th.	10	15.3	19.7
	do.		11th.	11	49.8	18.9
	do.		15th.	13	7.0	19.3
	do.		18th.	14	4.9	19.3
	do.		19th.	14	23.7	18.3

Result of the Observations for the Longitude.

			h	′	″	
1799. By an emersion of the 1st satellite of ♃ on Dec.	23d.		5	26	27	West from Greenwich.
	25th.	do.	5	26	37	
	27th.	2d. do.	5	25	27	
1800. Jan.	1st.	1st. do.	5	26	27	
	3d.	do.	5	26	45	
	do.	2d. do.	5	25	47	
	17th.	By a lunar observation	5	26	56	
	do.	do.	5	27	3	
	18th.	do.	5	25	42	
	do.	do.	5	26	3	

Result

Result of the Obfervations made at Point Peter to determine the Latitude.

The Zenith diftances ftand as below.

Face of the Sector Eaft.

1799.	β Andromedæ ° ′ ″	β Tauri. ° ′ ″	Caftor. ° ′ ″	Pollux. ° ′ ″	α Lyræ. ° ′ ″	α Andromedæ. ° ′ ″
Dec. 22d.	. . . .	. . . .	. . . .	. . . .	7 55 37 N.	. . . .
23d.	. . . .	2 15 3 S.	1 38 12 N.	2 10 38 S.	. . . .	. . . .
24th.	3 53 16 N.	2 14 51	1 38 20	. . . .	7 55 37	2 41 22 S.
25th.	3 53 16	. . . .	. . . .	2 10 34	7 55 46	2 41 16
Means	3 53 16	2 14 57	1 18 16	2 10 36	7 55 40	2 41 19
			Face of the Sector Weft.			
27th.	3 45 48	2 22 20	1 30 52	2 17 57	7 48 25	2 48 37
28th.	3 45 51	. . . .	. . . .	. . . .	7 48 24	2 48 33
29th.	. . . .	2 22 21	1 31 0	2 17 59	. . . .	. . . .
Means	3 45 49.5	2 22 20.5	1 30 56	2 17 58	7 48 24.5	2 48 35
Means face eaft	3 53 16	2 14 57	1 18 16	2 10 36	7 55 40	2 41 19
Means	3 49 32.7	2 18 38.7	1 34 36	2 14 17	7 52 2.2	2 44 57
Refractions	+ 3.8	+ 2.3	+ 1.6	+ 2.2	+ 7.9	+ 2.7
True zenith diftances	3 49 36.5	2 18 41	1 34 37.6	2 14 19.2	7 52 10.1	2 44 59.7
Mean declinations Dec. 25th.	34 33 26 N.	28 25 28 N.	32 18 47 N.	28 29 47 N.	38 36 15 N.	27 59 13 N.
Aberrations	+ 10.8	+ 2	— 3.4	— 3.4	+ 1	+ 9
Nutations	— 1.7	+ 7	+ 8.6	+ 8.7	— 8	— 3.4
True declinations	34 33 35.1	28 25 37	32 18 52.2	28 29 52.3	38 36 8	27 59 18.6
True zenith diftances applied	—3 49 36.5	+2 18 41	—1 34 37.6	+2 14 19.2	—7 52 10.1	+2 44 59.7
Latitudes N.	30 43 58.6	30 44 18	30 44 14.6	30 44 11.5	30 43 57.9	30 44 18.3

Latitude

			°	′	″
Latitude by	β Andromedæ	.	30	43	58.6
do.	β Tauri	.	30	44	18
do.	Caftor	.	30	44	14.6
do.	Pollux	.	30	44	11.5
do.	α Lyræ	.	30	43	57.9
do.	α Andromedæ	.	30	44	18.3
Mean Latitude north		.	30	44	9.8*

Examination of the meridian by the tranfit of γ Caffiopeæ and α Urfæ Minoris or the Pole ftar.

	°	′	″
Mean A. R. γ Caffiopeæ Dec. 31ft 1799	11	11	11.3
Aberration		—	1.3
Nutation		—	23.3
True A. R. γ Caffiopeæ	11	10	46.7
Mean A. R. Pole ftar Dec. 31ft 1799	13	6	47.0
Aberration		+	36.0
Nutation	—	4	30
True A. R. Pole ftar	13	2	53
do. γ Caffiopeæ	11	10	46.7
Difference	1	52	6.3

	′	″
The above difference is nearly, in mean folar time equal to	7	27
Obferved difference on the 31ft of Dec.	7	31
Difference	0	4

The difference between the calculated, and obferved time, is fo fmall, that it is fcarcely fufficient with the very beft inftrument to be perceptible in the motion of the Pole ftar. The meridian may therefore be confidered as fufficiently accurate for the following purpofe.

In

* Although this refult is deduced from obfervations made with the fmall fector only, it may be confidered as fufficiently accurate for the niceft geographical purpofes.

In order to determine the exact positions of the flag staff in the fort at Point Peter, the south end of Cumberland Island, and the north end of Amelia Island, the meridian was extended south from the observatory the distance of 99.12 perches.

		°	′	″
From the observatory the bearing of the flag staff in the fort was .	S.	22	23	00 E.
From do. to a signal on the north end of Amelia Island .	S.	62	53	00 E.
From do. to do. on the south end of Cumberland Island .	S.	65	30	30 E.
From the south end of the base the bearing of the flag staff in the fort was .	S.	42	19	30 E.
From do. to the signal on the north end of Amelia Island .	S.	66	33	00 E.
From do. to do. on the south end of Cumberland Island .	S.	72	2	30 E.

From these data by plain trigonometry the distance from the observatory to the flag staff in the fort comes out	195.7	Perches.
From do. to the signal on the north end of Amelia Island	1421.9	
From do. to do. on the south end of Cumberland Island	828.7	

	°	′	″
Diff. of latitude between the observatory and flag staff .	0	0	29.5
do. signal on Amelia Island	0	1	45.7
do. do. on Cumberland Island	0	0	56.0

	°	′	″	
The latitude of the flag staff is therefore .	30	43	40.3	North.
do. north end of Amelia Island	30	42	24.1	
do. south end of Cumberland	30	43	13.8	

From which it appears that the junction of the Chatahocha, or Apalachicola, and Flint Rivers, and the entrance between Cumberland, and Amelia Islands into the sound, are precisely in the same parallel of latitude.

The angles were taken with the instrument already mentioned, made by Mr George Adams.

1800.

Feb. 6th. Ascended the St. Mary's as high as it was navigable for canoes.*

* We ascended the river with as little loading and baggage as possible. —I even left my hat and thermometer.

7th. Sent out a party to discover the source of the river or its communication with Okefonoke swamp. Set up the clock.

8th. Cloudy with heavy rain.

9th. *Equal altitudes of the Sun.*

A. M. $9^h\ 2'\ 46''$. P. M. $2^h\ 53'\ 18''$.

10th. Cloudy all day with an appearance of rain.

11th. Shower at day break—Cloudy all day with cold N. wind.

12th. Smart frost, cold all day, and cloudy in the evening.

Equal altitudes of the Sun.

A. M. $8^h\ 46'\ 1''$. P. M. $3^h\ 10'\ 15''$.

The telescope and transit instrument arrived.

13th. Very cloudy, and cold in the morning:—heavy rain all the afternoon and night.

14th. Cloudy with fine rain in the forenoon: cleared off in the afternoon with a N. W. wind.

Set up both Sectors with the faces to the East.

				°	′	″	
Observed zenith distance of		β Tauri	(small sector)	1	52	31	s.
do.	. .	Castor	.	1	58	6	N.
do.	small sector	do.	. .	2	1	3	N.
do.	. .	Pollux	. .	1	50	49	s.
do.	small sector	do.	. .	1	47	49	s.
do.	small sector	α Coro. Borealis	.	2	54	26	s.

15th. Very cool, strong wind from the N. W.

Observed zenith distance of β Andromedæ $4^\circ\ 12'\ 38''$ N.

Equal

Equal altitudes of the Sun.
A. M. $8^h\ 54'\ 45''$. P. M. $3^h\ 1'\ 24''$.

These equal altitudes are doubtful a few seconds (from the violence of the wind) but not more than four.

		°	′	″	
Observed zenith distance of	β Tauri . .	1	55	13	S.
do. small sector	do. . .	1	52	35	S.
do. . . .	Castor . .	1	58	10	N.
do. . . .	Pollux .	1	50	46	S.
do. . . .	α Coro. Borealis	2	57	16	S.
do. small sector	do. . .	2	54	54	S.

The observed times, and distances, of the ☉'s and ☽'s nearest limbs.

	h	′	″	°	′	″	
	19	48	31	90	56	30	
	19	49	35	90	56	00	
	19	50	28	90	55	40	
	19	51	8	90	55	30	Error of the Sextant add 5″.
	19	51	42	90	55	20	
	19	52	9	90	55	0	
	19	52	34	90	54	50	
	19	53	6	90	54	20	
Means	19	51	9	90	55	24	

16th. *Equal altitudes of the Sun.*
A. M. $9^h\ 2'\ 32''$. P. M. $2^h\ 53'\ 29''$.

These equal altitudes are doubtful 2 or 3 seconds from the interference of clouds.

		°	′	″	
Observed zenith distance of	β Tauri .	1	55	9	S.
do. small sector	do. .	1	52	36	S.
do. . .	Castor .	1	58	7	N.
do. small sector	do. .	2	0	51	N.
do. . .	Pollux .	1	50	50	S.
do. small sector	do. .	1	47	36	S.

Emersion of the 1st satellite of ♃ observed at $12^h\ 5'\ 40''$. Night very fine, belts distinct, magnifying power 120.

Observed

Obſerved zenith diſtance of α Coro. Borealis $2^{\circ}\ 57'\ 19''$ s.
do. ſmall ſector do. . 2 54 29 s.

17th. Cloudy in the morning and continued ſo at times all day.

Equal altitudes of the Sun.
A. M. $9^{h}\ 24'\ 49''$. P. M. $2^{h}\ 31'\ 3''$.

The above equal altitudes are doubtful 2 or 3 ſeconds on account of the clouds.

Hazy all the evening.

Obſerved zenith diſtance of Caſtor . $1^{\circ}\ 58'\ 9''$ N.
do. . . Pollux . 1 50 50 s.

Between 14 and 15 hours traced a meridian by ε Urſæ Majoris and the Pole ſtar.

Obſerved zenith diſtance of α Lyræ (ſmall ſector) $8^{\circ}\ 17'\ 8''$ N.

The obſerved times, and diſtances, of the ☉'s and ☽'s neareſt limbs.

	h	′	″	°	′	″	
	19	53	40	64	40	00	
	19	54	14	64	39	50	
	19	54	43	64	39	40	
	19	55	22	64	39	30	
	19	56	1	64	39	20	
	19	56	26	64	39	00	Error of the Sextant add 5″.
	19	56	49	64	38	50	
	19	57	21	64	38	40	
	19	57	59	64	38	40	
	19	58	38	64	38	30	
	19	59	10	64	38	20	
Means	19	56	24	64	39	7	

18th. ☉'s preceding limb on the meridian at $11^{h}\ 56'\ 35''$ A. M.
Subſequent do. at . . 11 58 48 A. M.

Centre do. at . . 11 57 41 A. M.

Obſerved

Obſerved zenith diſtance of β Andromedæ 4° 12′ 39″ N.

Equal altitudes of the Sun.
A. M. 8^h 57′ 23″. P. M. 2^h 58′ 20″.

Turned the Face of the ſmall Sector Weſt.

Cloudy at times all the afternoon and night.

Obſerved zenith diſtance of Caſtor (ſmall ſector) 1° 53′ 40″ N.

The obſerved times, and diſtances, of the ☉'s and ☽'s neareſt limbs.

	h	′	″	°	′	″	
	20	0	7	51	39	30	
	20	0	43	51	39	20	
	20	1	22	51	39	10	
	20	2	15	51	39	0	
	20	3	6	51	38	50	Error of the Sextant add 5″.
	20	3	42	51	38	40	
	20	4	27	51	38	20	
	20	4	59	51	38	0	
	20	5	37	51	37	50	
	20	6	14	51	37	40	
Means	20	3	15	51	38	38	

☽'s Subſequent limb on the meridian at . 20^h 38′ 00″.

The obſerved times, and diſtances, of the ☉'s and ☽'s neareſt limbs.

	h	′	″	°	′	″	
	20	37	42	51	28	30	
	20	39	14	51	27	50	
	20	39	50	51	27	40	
	20	40	20	51	27	30	Error of the Sextant add 5″.
	20	41	2	51	27	20	
	20	41	29	51	27	00	
	20	41	59	51	26	50	
	20	42	30	51	26	40	
Means	20	40	31	51	27	25	

♀ paſſed

♀ paſſed the meridian at . $21^h\ 11'\ 32''$ centrum.

19th. Smart froſt this morning, very cloudy at noon, clear at 2^h P. M.

Equal altitudes of the Sun.
A. M. $8^h\ 48'\ 44''$. P. M. $3^h\ 6'\ 49''$.

Turned the Face of the large Sector Weſt.

			°	′	″	
Obſerved zenith diſtance of		β Tauri .	1	56	56	S.
do.	ſmall ſector	do. .	1	59	6	S.
do.	. .	Caſtor .	1	56	17	N.
do.	ſmall ſector	do. .	1	53	33	N.
do.	. .	Pollux .	1	52	37	S.
do.	ſmall ſector	do. .	1	55	20	S.
do.	. .	α Coro. Borealis	2	59	9	S.
do.	ſmall ſector	do. .	3	1	42	S.

Night cold, ſharp froſt, and water froze within 9 feet of our fires.

	h	′	″	
♀ paſſed the meridian at . .	21	12	38	centrum.
☽'s ſubſequent limb paſſed the meridian at	21	28	16,5	
20th. ☉'s preceding limb on the meridian at	11	56	25	A. M.
Subſequent do. at .	11	58	38	A. M.
Centre at	11	57	31.5	A. M.

Obſerved zenith diſtance of β Andromedæ $4°\ 10'\ 50''$ N.

Equal altitudes of the Sun.
A. M. $8^h\ 30'\ 55''$. P. M. $3^h\ 24'\ 29''$.

			°	′	″	
Obſerved zenith diſtance of		β Tauri .	1	56	56	S.
do.	. .	Caſtor .	1	56	19	N.
do.	ſmall ſector	do. .	1	53	46	N.
do.	.	Pollux .	1	52	35	S.
do.	.	α Coro. Borealis	2	59	8	S.
do.	ſmall ſector	do. .	3	1	42	S.

Cold

Cold for this climate, at 7^h P. M. linen that was waſhed, and left out to dry, was frozen ſtiff, and ice nearly $\frac{1}{8}$th of an inch thick was formed within 9 feet of our fires, which were large, and kept up all night.

Obſerved zenith diſtance of α Lyræ (ſmall ſector) 8° 10′ 58″.

	h	′	″	
♀ paſſed the meridian at .	21	13	48	centrum.
☽'s ſubſequent limb on the meridian at	22	25	8	
21ſt. ☉'s preceding limb on the meridian at	11	56	20.5	A. M.
Subſequent do. at . .	11	58	33	A. M.
Centre at	11	57	26.7	A. M.

Equal altitudes of the Sun.
A. M. 8^h 50′ 59″. P. M. 3^h 4′ 18″.

			°	′	″	
Obſerved zenith diſtance of	β Andromedæ		4	10	49	N.
do. . .	β Tauri	.	1	56	56	S.
do. ſmall ſector	do.	.	1	59	27	S.
do. . .	Caſtor	.	1	56	19	N.
do. ſmall ſector	do.	.	1	53	40	N.
do. . .	Pollux	.	1	52	37	S.
do. ſmall ſector	do.	.	1	55	48	S.

	h	′	″	
♀ paſſed the meridian at	21	15	0	centrum.
22d. ☉'s preceding limb on the meridian at	11	56	18	A. M. } tremulous.
Subſequent do. at	11	58	38	A. M. } tremulous.
Centre at . .	11	57	24	A. M.

Equal altitudes of the Sun.
A. M. 8^h 53′ 59″. P. M. 3^h 1′ 9″.

♀ paſſed the meridian at . 21^h 16′ 13″.5 centrum.

23d. Very warm.

Equal altitudes of the Sun.
A. M. 9h 25′ 41″. P. M. 2h 29′ 19″.

♀ passed the meridian at . 21h 17′ 22″ centrum.

		h	′	″	
24th.	☉'s preceding limb on the meridian at	11	56	10	A. M.
	Subsequent do. at . .	11	58	21	A. M.
	Centre at	11	57	15.5	A. M.

Equal altitudes of the Sun.
A. M. 8h 41′ 37″. P. M. 3h 13′ 18″.

Immersion of the 3d satellite of ♃ observed at 11h 45′ 38″. —Belts distinct, magnifying power of the telescope 120.

♀ passed the meridian . 21h 18′ 30″ centrum.

Very hazy, the planet at times not visible.

		h	′	″	
25th.	☉'s preceding limb on the meridian at	11	56	6	A. M.
	Subsequent do. at . .	11	58	16	A. M.
	Centre at	11	57	11	A. M.

Equal altitudes of the Sun.
A. M. 8h 48′ 13″. P. M. 3h 6′ 32″.

Emersion of the 1st satellite of ♃ observed at 8h 30′ 26″. A little hazy, but the belts were middling well defined, magnifying power 120.

End of the astronomical observations at this station.

Rate

Rate of the Clock's going up the St. Mary's.

1800.				′	″	Daily gain. ″
Clock too flow mean time	Feb.	9th.	.	16	48.5	
do. . .		12th.	.	16	39.5	. . 3
do. . .		15th.	.	16	35.6	. . 1.3
do. . .		16th.	.	16	35.7	. . 0
do. . .		18th.	.	16	34.8	. . 0.4
do. . .		19th.	.	16	34.1	. . 0.7
do. . .		20th.	.	16	32.2	. . 1.9
do. . .		21ft.	.	16	28.7	. . 3.5
do. . .		22d.	.	16	24.5	. . 4.2
do. .		23d.	.	16	20.7	. . 3.8
do. . .		24th.	.	16	15.2	. . 5.5
do. . .		25th.	.	16	10.2	. . 5.2

Note, In the above ftatement, where the equal altitudes, and the paffage of the ⊙ over the meridian have not given the fame error, a mean has been taken, however the difference in all cafes was fo fmall, that it might arife from a want of perfection in making the obfervations themfelves.

Refult of the obfervations made up the St. Mary's for determining the longitude.

			h	′	″	
Feb.	15th.	By the ☽'s diftance from the ⊙	5	29	18	West from Greenwich.
	16th.	*Emerfion* of the 1ft fatellite of ♃	5	29	7	
	17th.	By the ☽'s diftance from the ⊙	5	29	55	
		do. . . .	5	30	18	
	18th.	. do. . . .	5	30	10	
		do. . . .	5	29	16	
	24th.	*Immerfion* of the 3d fatellite of ♃	5	27	58	
	25th.	*Emerfion* of the 1ft do. .	5	28	53	

Result of the Obſervations made with the large Sector, up the St. Mary's, to determine the Latitude.

The Zenith Diſtances ſtand as below.

Face of the Sector Eaſt.

1800.	β Andromedæ. ° ′ ″	β Tauri. ° ′ ″	Caſtor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″
February 14th.	. . . .	. . . .	1 58 6 N.	1 50 49 S.	. . . .
15th.	4 12 38 N.	1 55 13 S.	1 58 10	1 50 46	2 57 16 S.
16th.	. . . .	1 55 9	1 58 7	1 50 50	2 57 19
17th.	. . . .	. . . .	1 58 9	1 50 50	. . . .
18th.	4 12 39	. . . .	. . . .	. . . .	. . . .
Means	4 12 38.5	1 55 11	1 58 8	1 50 48.7	2 57 17.5

Face of the Sector Weſt.

19th.	. . . .	1 56 56	1 56 16	1 52 37	2 59 9
20th.	4 10 50	1 56 56	1 56 19	1 52 35	2 59 8
21ſt.	4 10 49	1 56 56	1 56 19	1 52 37	. . . .
Means	4 10 49.5	1 56 56	1 56 18	1 52 36.3	2 59 8.5
Means face eaſt	4 12 38.5	1 55 11	1 58 8	1 50 48.7	2 57 17.5
Means	4 11 44	1 56 3.5	1 57 13	1 51 42.5	2 58 13
Refractions	+ 4.2	+ 2	+ 2	+ 1.9	+ 3
True zenith diſtances	4 11 48.2	1 56 5.5	1 57 15	1 51 44.4	2 58 16

	β Andromedæ. ° ′ ″	β Tauri. ° ′ ″	Caſtor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″
Mean declinations on the 18th.	34 33 28 N.	28 25 28 N.	32 18 44 N.	28 29 46 N.	27 23 47 N.
Aberrations	+ 2.1	+ 2.3	+ 0.3	— 0.9	— 14.7
Nutations	— 1.4	+ 7.3	+ 9.0	+ 9.0	— 4.1
Semi-annual equations	— 0.4	+ 0.3	+ 0.1	0.0	— 0.4
True declinations	34 33 28.3	28 25 37.9	32 18 53.4	28 29 54.1	27 23 27.8
True zenith diſtances applied	—4 11 48.2	+1 56 5.5	—1 57 15	+1 51 44.4	+2 58 16
Latitudes N.	30 21 40.1 N.	30 21 43.4 N.	30 21 38.4 N.	30 21 38,5 N.	30 21 43.8 N.

		°	′	″
Latitude by	β Andromedæ	30	21	40.1
do. .	β Tauri	30	21	43.4
do. .	Caſtor	30	21	38.4
do. .	Pollux	30	21	38.5
do. .	α Coro. Borealis . . .	30	21	43.8
Mean Latitude North.	. . . . . .	30	21	40.8

Reſult

Refult of the Obfervations made with the Small Sector, up the St. Mary's, to determine the Latitude.

The Zenith Diftances when arranged ftand as below.

Face of the Sector Eaft.

1800.	β Tauri. ° ′ ″	Caftor. ° ′ ″	Pollux. ° ′ ″	α Coro. Borealis. ° ′ ″	α Lyræ. ° ′ ″
Feb. 14th.	1 52 31 s.	2 1 3 N.	1 47 49 s.	2 54 26 s.	. . . .
15th.	1 52 35	. . . .	. . . .	2 54 34	. . . .
16th.	1 52 36	2 0 51	1 47 36	2 54 29	. . . .
17th.	. . . .	. . . .	. . . .	. . . .	8 17 8 N.
Means	1 52 34	2 0 57	1 47 42.5	2 54 29.7	8 17 8

Face of the Sector Weft.

	β Tauri.	Caftor.	Pollux.	α Coro. Borealis.	α Lyræ.
18th.	. . . .	1 53 40	. . . .	. . . .	. . . .
19th.	1 59 6	1 53 33	1 55 20	3 1 42	. . . .
20th.	. . . .	1 53 46	. . . .	3 1 37	8 10 58
21ft.	1 59 27	1 53 40	1 55 48	. . . .	. . . .
Means	1 59 16.5	1 53 39.7	1 55 34	3 1 39.5	8 10 58
Means face eaft	1 52 34	2 0 57	1 47 42.5	2 54 29.7	8 17 8
Means	1 55 55.2	1 57 18.3	1 51 38.2	2 58 4.6	8 14 3
Refractions	+ 1.9	+ 2	+ 1.9	+ 3	+ 8.2
True zenith diftances	1 55 57.1	1 57 20.3	1 51 40.1	2 58 7.6	8 14 11.2
Mean declinations Feb. 18th.	28 25 28 N.	32 18 44 N.	28 29 46 N.	27 23 47 N.	38 36 15.5
Aberrations	+ 2.3	+ 0.3	— 0.9	— 14.7	— 14.8
Nutations	+ 7.3	+ 9.0	+ 9.0	— 4.1	— 8.6
Semi. ann. equations	+ 0.3	+ 0.1	0.0	— 0.4	— 0.1
True declinations	28 25 37.9	32 18 53.4	28 29 54.1	27 23 27.8	38 35 52.0
True zenith diftances applied	+1 55 57.1	—1 57 20.3	+1 51 40.1	+2 58 7.6	—8 14 11.2
Latitudes N.	30 21 35.0 N.	30 21 33.1 N.	30 21 34.2 N.	30 21 35.4 N.	30 21 40.8 N.

Latitude

		°	′	″
Latitude by β Tauri	. . . . .	30	21	35.0
do. Castor	. . . . .	30	21	33.1
do. Pollux	. . . . .	30	21	34.2
do. α Coro. Borealis	. . . . .	30	21	35.4
do. α Lyræ	. . . . .	30	21	40.8
Mean latitude north	. . . .	30	21	35.7

The ſame number of ſtars were taken with each ſector; but the large one from the length of its radius, being at leaſt three times as accurate as the ſmall one, the latitude by the large one, was multiplied by three, and the latitude by the ſmall one added to that product, and the ſum divided by four, the quotient 30° 21′ 39″.5 was taken for the true latitude of the obſervatory.

This being the higheſt point to which we could aſcend the river, and the country ſo covered with water, that it was impoſſible with our few remaining broken down pack horſes to convey our apparatus by land to the ſource of the river: we therefore had to determine the geographical poſition of its ſource by a traverſe; the courſes of which are as follows: viz. beginning at the obſervatory A, (Plate XII.) where a hewn poſt was ſet up and ſurrounded by a large mound of earth, from thence N. 10° 1′ W. 4435.6 perches, thence S. 85° 14′ W. 115.6 perches, thence north 44.8 perches at the end of which a hewn poſt was ſet up, and ſurrounded by a mound of earth B.—Theſe courſes when tabled will ſtand as below.

Courſes.	N.	S.	E.	W.
N. 10° 1′ W. 4435.6 ps.	4368	. . . . . .	. . . . . .	771.2
S. 85° 14′ W. 115.6 ps.	. . . . .	9.6	. . . . . .	115.2
N. 44.8 ps.	44.8	. . . . . .	. . . . . .	. . . . .
	4412.8	9.6	. . . . . .	886.4
	— 9.6	. . . . . .	. . . . . .	. . . . . .
	4403.2	. . . . . .	. . . . . .	886.4

The laſt mentioned mound of earth was thrown up on the margin of the Okefonoke ſwamp, and as near to it as any permanent mark could be placed on account of the water.

From Plate XII. upon which the above traverſe is laid down, it may be ſeen that the river St. Mary's is formed by the water draining out of the Okefonoke ſwamp along ſeveral marſhes, or ſmall ſwamps, which join into one, and form, or conſtitute the main branch or body of the river. The principal, or largeſt of thoſe ſwamps, or drains, is the moſt eaſterly one, and in which the current is the moſt viſible. This marſh, or drain is croſſed by the laſt courſe of the traverſe, which terminates at the mound B. From this mound north-eaſterly into the ſwamp, the water has but little, if any perceptible current. The ſource of the river is therefore in an in-

determinate

determinate ſpace; and no ſpecific point could be fixed on, as the ſwamp is at all times almoſt impenetrable, and at this ſeaſon of the year abſolutely ſo without immenſe labour, and expence. It was therefore agreed that the termination of a line, ſuppoſed to be drawn N. 45°, E. 640 perches from the mound B, ſhould be taken as a point to, or near which, a line ſhould be drawn from the mouth of Flint river; which line when drawn, ſhould be final, and conſidered as the permanent boundary between the United States and His Catholic Majeſty, provided it paſſed not leſs, than one mile north of the mound B: but if upon experiment, it ſhould be found to paſs within leſs than one mile north of the ſaid mound, it ſhould then be corrected to carry it to that diſtance. To obtain as near as poſſible the courſe of the ſaid line, with the diſtance between the points to be joined, the following materials deduced from our previous operations were uſed. The longitudes made uſe of are from meaſurements, compounded with the eclipſes of the 1ſt ſatellite of Jupiter.

The longitude of the obſervatory near the mouth of Flint river by the eclipſes of the 1ſt ſatellite of ♃ is $5^h\ 39'\ 19''$ weſt from Greenwich. The longitude of our ſtation on Thompſon's Creek, by a mean of five good obſervations is $6^h\ 4'\ 48''$ weſt from Greenwich. From Thompſon's Creek to the Flint river obſervatory, the diſtance is 371.21 miles, which in the parallel of 31° is equal to $24'\ 57''$ in time, which deducted from the longitude at Thomſon's Creek, will leave $5^h\ 39'\ 51''$ for the longitude of the obſervatory near the mouth of Flint river; which diſagrees with the longitude by obſervation $32''$ in time. Meaſurements when accurately executed, in a known parallel of latitude, are generally preferable to obſervations for diſtances, not exceeding 100 miles: yet in this caſe, the meaſurement is not entitled to that weight, being done in haſte, with a common chain, through thickets, ſwamps, and ponds, where pins of more than ordinary lengths had to be made uſe of, which involved an unſurmountable ſource of error: but not in ſo conſiderable a degree as to juſtify its rejection. It was therefore concluded, that if to twice the longitude of the obſervatory near the mouth of Flint river, the longitude by meaſurement from Thompſon's Creek be added, and the ſum divided by three, the quotient $5^h\ 39'\ 30''$ would be the longitude of the obſervatory near the mouth of Flint river, as correctly as it could be had from our materials: But the mouth of Flint river was found by meaſurement to be 260 perches, equal in time to $3''.3$ weſt from the obſervatory; which added to the above determination, the decimal .3 being rejected, as unimportant, when errors much larger are unavoidable, will give $5^h\ 39'\ 33''$ for the longitude of the mouth of Flint river.—The latitude has already been ſettled at $30°\ 42'\ 42''.8$.

The longitude of the obſervatory at A, up the St. Mary's by obſervation is $5^h\ 29'$. The longitude of the obſervatory at Point Peter by four good obſervations is $5^h\ 26'\ 34''$: the difference of longitude by obſervation is $2'\ 26''$.—The difference of longitude between the obſervatories, by a traverſe taken for that purpoſe, was 37.45 miles which is equal to $2'\ 32''$. The traverſe being made under very unfavourable circumſtances, and conſiſted of an uncommon number of courſes, owing to the ſwamps, and ponds, (with which the country abounds), being full of water, and impaſſable:

paſſable: the mean 2′ 29″ was therefore taken for the difference of longitude, which added to 5^h 26′ 34″ the longitude of Point Peter will give 5^h 29′ 3″ for the longitude of the obſervatory at A.—The difference of latitude between A, and the mound B, has been ſhewn to be 4403.2 perches, and the difference of longitude 886.4 perches weſt: thence to the end of the line ſuppoſed to be drawn N. 45 E. 640 perches from the mound B, the difference of latitude will be 452.5 perches; which added to the difference of latitude between A, and B, will give 4855.7 perches, or 13′ 8″.5 nearly, which added to 30° 21′ 39″.5 the latitude of A, will give 30° 34′ 48″ for the latitude of the termination of the line ſuppoſed to be drawn from B.—From the obſervatory at A, to the mound B, the difference of longitude by meaſurement has been ſtated at 886.4 perches weſt, from thence to the termination of the line ſuppoſed to be drawn from B, the difference of longitude is 452.5 perches eaſt, which deducted from the weſting, will leave 433.9 perches weſt, which is equal to about 6″ in time, and when added to 5^h 29′ 3″ the longitude at A will give 5^h 29′ 9″ for the longitude of the termination of the line ſuppoſed to be drawn as above; which deducted from the longitude of the mouth of Flint river, will leave 10′ 24″ for the difference of longitude between the points.

There are now given

The latitude of the mouth of Flint river = . .	30° 42′ 42″.8
The latitude of the termination of the line ſuppoſed to be drawn from B	= 30 34 48
The difference of longitude between the mouth of Flint river, and the termination of the line ſuppoſed to be drawn from B	= 0^h 10′ 24″ = 2° 36′

To find the courſe, and diſtance between the given points, that is, between the mouth of Flint river, and the termination of the line ſuppoſed to be drawn from B, which is done as follows:

In the ſpherical triangle DEF, let DE repreſent the co. latitude of the mouth of Flint river = 59° 17′ 17″.2. FE the co. latitude of the termination of the line ſuppoſed to be drawn from B = 59° 25′ 12″, and the included angle DEF 2° 36′, being the difference of longitude between the given points.

For the required side.

	°	′	″			
Included angle . .	2	36	0			
Half	1	18	0	. .	S	8.3557835
Diff. of the sides . .	0	7	54.8			
Half	0	3	57.4	co. ar.	S	3.9389855
DE	59	17	17.2	. .	½ S	4.9671851
FE	59	25	12	. .	½ S	4.9674813
	89	39	44	.	Tangent	12.2294354
	89	39	44	co. ar.	S	0.0000075
½ Diff. of the sides .	0	3	57.4	. .	S	6.0610145
	1	7	6.5		S	8.2904574
			2			
DF	2	14	13 = 155.2 miles nearly.			

For the angles.

	°	′	″			
FE	59	25	12			
DE	59	17	17.2			
Sum	118	42	29.2			
Diff.	0	7	54.8			
½ Sum	59	21	14.6	co. ar.	S	0.0653339
½ Diff.	0	3	57.4	. .	S	7.0610145
Included angle . .	2	36	0			
½ Included angle .	1	18	0.0	.	c. Tang^t.	11.6441047
½ Diff. of the angles .	3	22	24	.	Tang^t.	8.7704531
½ Sum of the sides .	59	21	14.6	co. ar.	c. S	0.2926586
½ Diff. of the sides .	0	3	57.4	.	c. S	9.9999997
½ Included angle . .	1	18	0	.	c. Tang^t.	11.6441047
½ Sum of the angles .	89	20	14	. .	.	11.9367630
½ Diff. of the angles .	3	22	24			
Greater angle . .	92	42	38			
Lesser angle . .	85	57	50			

From

From which it follows, that an arc of a great circle making an angle with the meridian at the mouth of Flint river from the ſouth, towards the eaſt of 87° 17′ 22″, being the ſupplement of the angle EDF, will ſtrike the termination of the line ſuppoſed to be drawn from B; provided the diſtance be as before ſtated. But if the diſtance between the points, ſhould either exceed the diſtance deduced from the previous operations ſeven miles, or fall ſhort of it an equal number, the line will nevertheleſs paſs within half a mile of the termination of the ſuppoſed line, and therefore fall within the ſpace of uncertainty as to the real ſource of the river.

If a common ſurveying compaſs ſhould be uſed, the before mentioned angle of 87° 17′ 22″ muſt be diminiſhed at the rate of about 1′ 32″ for every three miles, to compenſate for the difference of 1° 19′ 32″ between the ſupplemental angle already mentioned, and the angle DFE, to produce as near a coincidence as poſſible with the arc of a great circle.

After erecting the mound B, we deſcended the river, and encamped on the ſouth end of Cumberland Iſland,* to prepare the report of our proceedings to both nations, and make our arrangements for leaving the country. At that encampment the following obſervations were made.

1800.

March 6th. Unloaded the veſſel, encamped and ſet up the clock.

7th. Cloudy and very cold.

8th. Stormy with cold rain.

9th. Storm continues.

10th. Violent wind, and heavy rain.

11th. Cloudy in the morning, ſtrong N. wind and fine rain.—Thermometer 49° in the morning, roſe to 57°.

12th. Clear,—thermometer 47° in the morning, roſe to 70°.

Equal altitudes of the Sun.
A. M. 8^h 53′ 50″. P. M. 3^h 6′ 55″.

13th. Thermometer 47° in the morning, roſe to 76°.

Rr 2 *Emerſion*

* The moſt ſouthern inclination of the United States on the Atlantic ocean.

Emerſion of the 1ſt ſatellite of ♃ obſerved at $6^h\ 58'\ 49''$. —Evening very clear, the belts diſtinct, magnifying power 120.

14th. Thermometer 49° at ſun riſe, roſe to 78°.

Equal altitudes of the Sun.
A. M. $8^h\ 54'\ 6''$. P. M. $3^h\ 5'\ 57''$.

15th. Thermometer 51° at ſun riſe, roſe to 84°.

Emerſion of the 2d ſatellite of ♃ obſerved at $11^h\ 54'\ 41''$. —The planet was low and uncommonly tremulous—the belts indiſtinct, magnifying power 120.

16th. Thermometer 57° at ſun riſe, roſe to 81°.

Equal altitudes of the Sun.
A. M. $9^h\ 5'\ 0''$. P. M. $2^h\ 54'\ 30''$.

17th. Thermometer 60° at ſun riſe, roſe to 81°.

Equal altitudes of the Sun.
A. M. $9^h\ 7'\ 24''$. P. M. $2^h\ 51'\ 57''$.

The obſerved times, and diſtances, of the ☉'s and ☽'s neareſt limbs.

	h	'	"	°	'	"	
	19	45	15	82	10	20	
	19	45	59	82	10	0	
	19	46	38	82	9	50	Add for the error of the Sextant 7″.
	19	47	15	82	9	30	
	19	47	51	82	9	20	
	19	48	30	82	9	00	
Means	19	46	55	82	9	40	

Repeated.

No. 8.

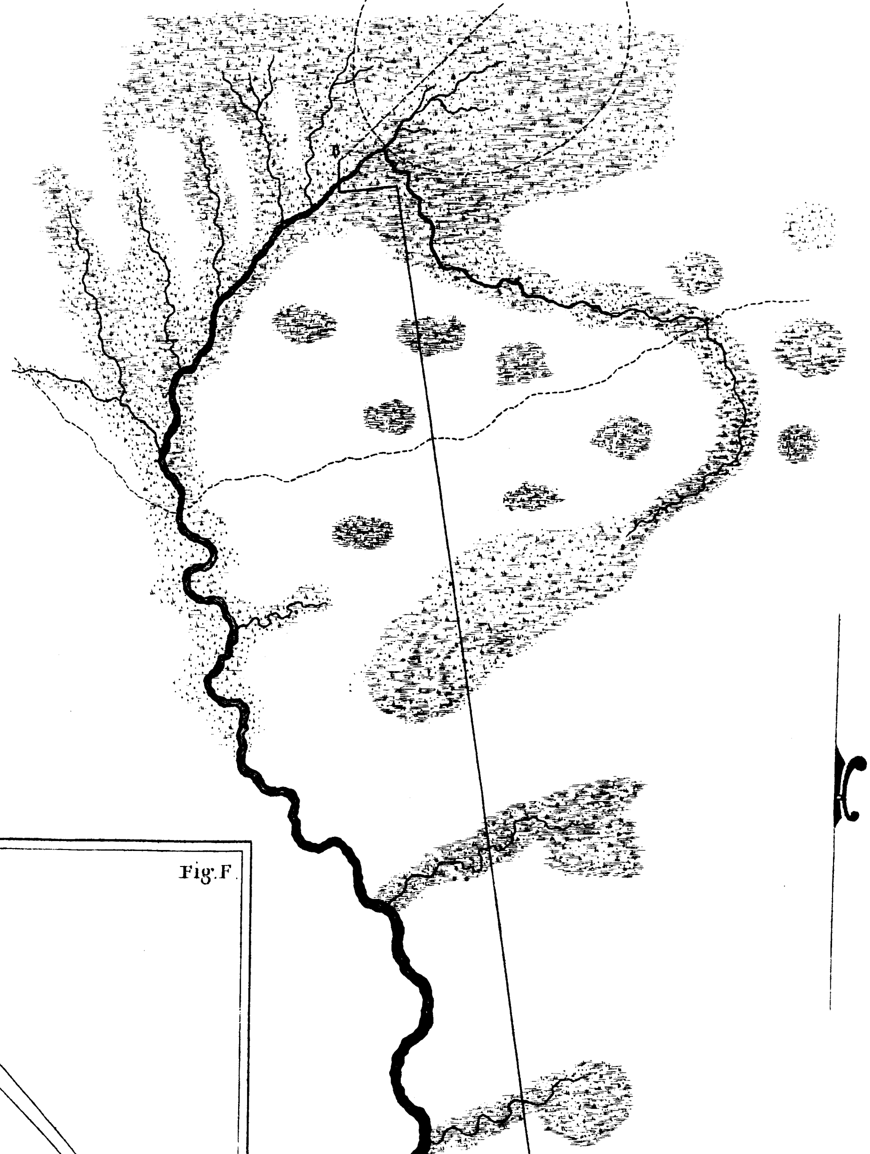
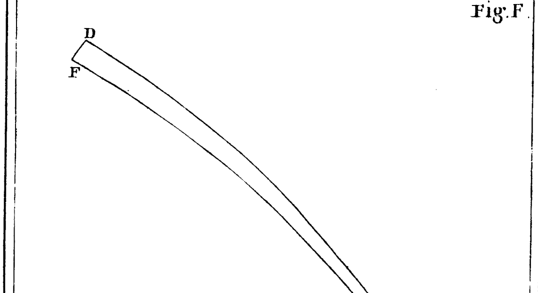
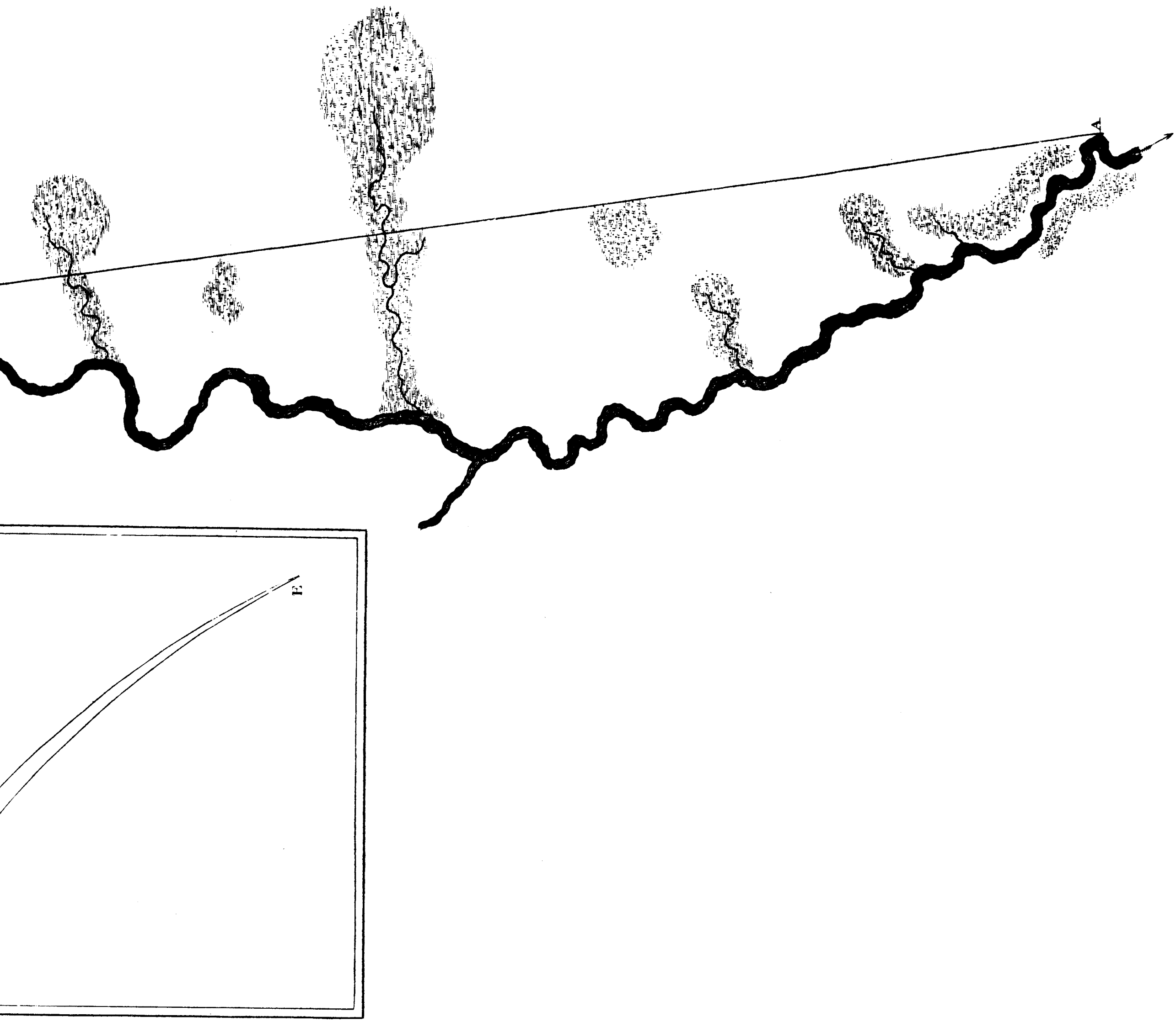

Ohefonoke Swamp.
The source of the
St. Marys is supposed to be
within this dotted line.
B

Fig. F.


D
F


A
E

Repeated.

	h	′	″	°	′	″	
	20	15	10	82	0	30	
	20	15	51	82	0	10	
	20	16	22	82	0	0	
	20	16	49	81	59	50	
	20	17	29	81	59	40	Add for the error of
	20	18	4	81	59	30	the Sextant 7″.
	20	18	33	81	59	20	
	20	19	2	81	59	10	
	20	19	35	81	59	0	
Means	20	17	26	81	59	41	

18th. Thermometer 62° at fun rife, rofe to 81°. —Cloudy with thunder great part of the day attended with a little rain.

19th. Thermometer 61° at fun rife, rofe to 86°. —Cloudy part of the day.

The obferved times, and diftances, of the ☉'s and ☽'s neareft limbs.

	h	′	″	°	′	″	
	20	14	6	56	37	00	
	20	14	45	56	36	50	
	20	15	44	56	36	40	
	20	16	33	56	36	30	Add for the error of
	20	17	11	56	36	20	the Sextant 7″.
	20	17	55	56	36	20	
	20	18	28	56	36	00	
Means	20	16	23	56	36	31	

20th. Thermometer 65° at fun rife, rofe to 82°.

Equal altitudes of the Sun.

A. M. 8^h 44′ 35″. P. M. 3^h 13′ 53″.

A thick

A thick fog towards evening from the S. E. —very cloudy at night.

21ſt. Thermometer 63° in the morning, roſe to 79°.

22d. Thermometer 60° at ſun riſe, roſe to 84°.

Equal altitudes of the Sun.
A. M. 8^h 50′ 17″. P. M. 3^h 7′ 53″.
Doubtful 3 or 4 ſeconds.

23d. Thermometer 61° at ſun riſe, roſe to 62°. —Cloudy great part of the day with a violent wind from the S. E.

24th. Thermometer 58° in the morning, fell to 56° in the afternoon, rain with a ſtrong wind from the S. E.

25th. Thermometer 56° at ſun riſe, roſe to 70°. —Flying clouds great part of the day.

Emerſion of the 3d ſatellite of ♃ obſerved at 7^h 1′ 3″.— Belts pretty diſtinct, magnifying power 120.

Diſcovered that the clock was conſiderably out of beat, owing to the poſt to which it was faſtened being moved by people inadvertently leaning againſt it in the tent:—The poſt being planted in looſe ſand, no better foundation to be had.

26th. Thermometer 50° at ſun riſe, roſe to 60°.

Equal altitudes of the Sun.
A. M. 8^h 44′ 23″. P. M. 3^h 13′ 0″.

Emerſion of the 4th ſatellite of ♃ obſerved at 8^h 8′ 57″. —Evening remarkably fine; magnifying power 200.—Although the ſatellite was too viſible to be miſtaken at the time above noted, it certainly had not fully recovered its luſtre

luſtre at 8^h $35'$, it emerged cloſe to the 2d ſatellite, which gave me an excellent opportunity of judging of its brightneſs.

27th. Thermometer 54° at ſun riſe, roſe to 68°.

Equal altitudes of the Sun.
A. M. 8^h $39'$ $41''$. P. M. 3^h $17'$ $35''$.

Emerſion of the 1ſt ſatellite of ♃ obſerved at 10^h $53'$ $10''$. —The planet very tremulous, and the belts ſcarcely diſcernible—magnifying power 120.

28th. Thermometer 61° at ſun riſe, roſe to 76°. —Cloudy in the afternoon.

29th. Thermometer 63° at ſun riſe, roſe to 81°. —Thunder and rain in the morning.

Equal altitudes of the Sun.
A. M. 8^h $42'$ $54''$. P. M. 3^h $14'$ $0''$.

30th. Thermometer 50° at ſun riſe, roſe to 75°.

Equal altitudes of the Sun.
A. M. 8^h $39'$ $12''$. P. M. 3^h $17'$ $30''$.

The obſerved times, and diſtances, of the ☉'s and ☽'s neareſt limbs.

	h	′	″	°	′	″	
	22	58	33	69	48	00	
	22	59	25	69	48	10	
	23	0	8	69	48	30	
	23	0	49	69	48	50	Add for the error of
	23	1	26	69	49	15	the Sextant 7″.
	23	2	12	69	49	40	
	23	3	3	69	50	10	
Means	23	0	48	69	48	56	

31ſt.

31st. Thermometer 53° at sun rise, rose to 86°.
April 1st. Thermometer 57° at sun rise, rose to 87°.

Equal altitudes of the Sun.
A. M. $8^h\ 53'\ 46''$. P. M. $3^h\ 2'\ 57''$.
Doubtful several seconds on account of clouds.

Immersion of the 3d satellite of ♃ observed at $8^h\ 1'\ 17''$. —The evening very fine, and the satellite lost its lustre, and disappeared more gradually than I ever saw it before, —Magnifying power 120.

Emersion of the same satellite observed at $11^h\ 5'\ 19''$. —The planet was low, and tremulous, and the belts very indistinct, magnifying power as above.

2d. Thermometer 61° at sun rise.

Emersion of the 2d satellite of ♃ observed at $6^h\ 30'\ 51''$. —The belts were well defined, but the sun having been set about 15 minutes and the day light being very strong, on which account the observed time might be diminished 10 or 15 seconds with propriety, magnifying power 120.

3d. Thermometer 66° at sun rise, rose to 78°. —Cloudy all day with heavy rain, and thunder at night.

4th. Thermometer 63° at sun rise, rose to 82°. —Cloudy all the forenoon.

5th. Thermometer 64° at sun rise, rose to 84°.

Equal altitudes of the Sun.
A. M. $8^h\ 39'\ 11''$. P. M. $3^h\ 17'\ 27''$.

Emersion of the 1st satellite of ♃ observed at $7^h\ 13'\ 19''$. —Belts well defined, magnifying power 120.

6th. Thermometer 61° at sun rise, rose to 85°.

Equal

Equal altitudes of the Sun.
A. M. 8^h 40′ 57″. P. M. 3^h 15′ 48″.

7th. Thermometer 62° at ſun riſe, roſe to 83°.
8th. Thermometer 65° at ſun riſe, roſe to 85°.
9th. Thermometer 70° at ſun riſe, roſe to 90°.

Equal altitudes of the Sun.
A. M. 8^h 23′ 52″. P. M. 3^h 32′ 58″.

Emerſion of the 2d ſatellite of ♃ obſerved at 9^h 9′ 28″. —A little hazy, magnifying power 120.

10th. Thermometer 62° at ſun riſe, roſe to 87°.

Equal altitudes of the Sun.
A. M. 8^h 57′ 6″. P. M. 2^h 59′ 48″.

Took down and packed up the inſtruments.

Rate of the Clock's going at the ſouth end of Cumberland Iſland.

			′	″	Daily gain. ″
Clock too ſlow mean time	March	12th.	9	44.3	
do.		14th.	9	31.6	6.3
do.		16th.	9	13.0	9.3
do.		17th.	8	59.6	13.4
do.		20th.	8	32.1	9.2
do.		22d.	8	4.4	13.9
do.		26th.	7	13.7	12.7
do.		27th.	6	58.7	15.0
do.		29th.	6	32.2	13.2
do.		30th.	6	19.7	12.5
do.	April	1ſt.	5	42.7	18.5
do.		5th.	4	32.2	17.6
do.		6th.	4	13.2	19.0
do.		9th.	3	16.4	18.9
do.		10th.	2	56.9	19.5

Refults of the obfervations, made for the longitude, at the fouth end of Cumberland Ifland.

			h	′	″	
March	13th.	*Emerfion* of the 1ft fatellite of ♃	5	26	29	West from Greenwich.
	15th.	do. . 2d . .	5	26	33	
	17th.	By a lunar obfervation .	5	26	59	
	17th.	do. . . .	5	26	25	
	19th.	do.	5	27	25	
	25th.	*Emerfion* of the 3d fatellite of ♃	5	26	14	
	26th.	do. of the 4th do. by the Nautical Almanac	5	51	48	
		By de Lambre's Tables .	5	27	37	
	27th.	*Emerfion* of the 1ft fatellite of ♃	5	25	43	
	30th.	By a lunar obfervation .	5	26	6	
April	1ft.	*Immerfion* of the 3d fatellite of ♃	5	24	6	
		Emerfion . do. . .	5	26	0	
	2d.	*Emerfion* of the 2d fatellite of ♃	5	26	49	
	5th.	do. . 1ft do. .	5	26	40	
	9th.	do. . 2d do. .	5	26	57	

By a mean of the 3 eclipfes of the 1ft fatellite of ♃, the longitude of the fouth end of Cumberland ifland comes out $5^h\ 26'\ 17''$ weft from Greenwich: By a traverfe from the obfervatory at Point Peter acrofs the found, the difference of longitude between that ftation, and the fouth end of Cumberland ifland is $10''$ nearly, which added to the longitude above, will give $5^h\ 26'\ 27''$ for the longitude of Point Peter; which is $7''$ lefs than by obfervation. But as there were more obfervations on the eclipfes of the 1ft fatellite taken at Point Peter, and a better agreement, that determination is entitled to the moft weight.—If therefore $2''$ be deducted from the longitude of the obfervatory at Point Peter as determined by obfervation, and $5''$ added to the longitude of the fouth end of Cumberland ifland as deduced from obfervation, the longitudes will ftand as below.

	h	′	″	
Longitude of the S. end of Cumberland ifland	5	26	22	Weft from Greenwich.
Longitude of the obfervatory at Point Peter .	5	26	32	

Thefe longitudes are probably as correct as they can be had by obfervations, the refult of which depends upon a theory not yet abfolutely perfect: but thefe, with other deductions of a like nature in the foregoing work, may be further corrected when compared with correfponding obfervations, or others made about the fame time, at obfervatories whofe pofitions have been accurately fettled. The latitude of the fouth end of Cumberland Ifland has already been ftated at $30°\ 43'\ 13''.8$ N.

The

The obfervations being now brought to a clofe, I have only to add, that they were made, and regiftered with fidelity, and correctly copied from the original entries in my journal, without a fingle alteration.—The errors of the clock, with its rate of going, as entered at the end of each courfe of obfervations, may readily be examined by the equal altitudes and other obfervations made for that purpofe: and for fear miftakes might happen, in reducing the obferved *time* of an obfervation for the longitude, to either mean, or apparent, the original *entry as noted at the clock*, has in all cafes been retained;—fo that any refult, which depends upon an accurate knowledge of the time, may be re-examined, and corrected if found erroneous.

It is prefumed, that no apology will be neceffary, for any fmall inaccuracies which may be difcovered in the aftronomical obfervations, when it is confidered that they were made at temporary ftations, and the apparatus frequently expofed to the weather, for want of tents, and other covering; and almoft as frequently fo injured by the tranfportation from one place, to another, through the wildernefs, that if I had not been in the habit of conftructing, and making inftruments for my own ufe, our bufinefs muft have been feveral times fufpended, till the repairs could have been made in Europe.